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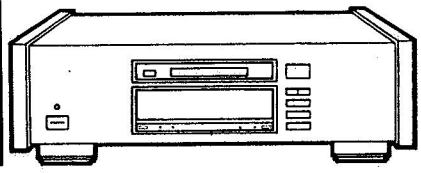
The future of sound and vision.

Service Manual



COMPACT DISC PLAYER

PD-73

MODEL PD-73 HAS FOLLOWING VERSIONS :

Type	Power requirement	Export destination
KU/CA	AC120V only	U.S.A. and Canada
HEM	AC220V,240V (switchable)*	European continent

* Change the transformer wire of terminal CN302.

- **This manual is applicable to the PD-73/KU/CA and HEM types.**
- **Ce manuel pour le service comprend les explications en français de réglage.**
- **Este manual de servicio trata del método ajuste escrito en español.**

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This service manual is intended for qualified service technicians; it is not meant for the casual do-it-yourselfer. Qualified technicians have the necessary test equipment and tools, and have been trained to properly and safely repair complex products such as those covered by this manual.
Improperly performed repairs can adversely affect the safety and reliability of the product and may void the warranty. If you are not qualified to perform the repair of this product properly and safely, you should not risk trying to do so and refer the repair to a qualified service technician.

WARNING
Lead in solder used in this product is listed by the California Health and Welfare agency as a known reproductive toxicant which may cause birth defects or other reproductive harm (California Health & Safety Code, Section 25249.5).
When servicing or handling circuit boards and other components which contain lead in in solder, avoid unprotected skin contact with the solder. Also, when soldering do not inhale any smoke or fumes produced.

1. SAFETY INFORMATION

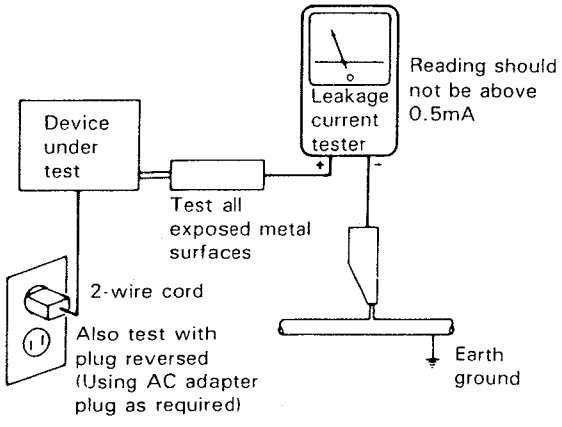
(FOR USA MODEL ONLY)

1. SAFETY PRECAUTIONS

The following check should be performed for the continued protection of the customer and service technician.

LEAKAGE CURRENT CHECK

Measure leakage current to a known earth ground (water pipe, conduit, etc.) by connecting a leakage current tester such as Simpson Model 229-2 or equivalent between the earth ground and all exposed metal parts of the appliance (input/output terminals, screwheads, metal overlays, control shaft, etc.). Plug the AC line cord of the appliance directly into a 120V AC 60Hz outlet and turn the AC power switch on. Any current measured must not exceed 0.5mA.


Reading should not be above 0.5mA
Leakage current tester
Device under test
Test all exposed metal surfaces
2-wire cord
Also test with plug reversed (Using AC adapter plug as required)
Earth ground

AC Leakage Test

ANY MEASUREMENTS NOT WITHIN THE LIMITS OUTLINED ABOVE ARE INDICATIVE OF A POTENTIAL SHOCK HAZARD AND MUST BE CORRECTED BEFORE RETURNING THE APPLIANCE TO THE CUSTOMER.

2. PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in the appliance have special safety related characteristics. These are often not evident from visual inspection nor the protection afforded by them necessarily can be obtained by using replacement components rated for voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this Service Manual.

Electrical components having such features are identified by marking with a ⚠ on the schematics and on the parts list in this Service Manual.
The use of a substitute replacement component which dose not have the same safety characteristics as the PIONEER recommended replacement one, shown in the parts list in this Service Manual, may create shock, fire, or other hazards.

Product Safety is continuously under review and new instructions are issued from time to time. For the latest information, always consult the current PIONEER Service Manual. A subscription to, or additional copies of, PIONEER Service Manual may be obtained at a nominal charge from PIONEER.

(FOR EUROPEAN MODEL ONLY)

VARO!
AVATTAESSA JA SUOJALUKITUS OHITETTAESSA OLET ALTTIINA NÄKYMÄTTÖMÄLLE LASERSÄTEILYLLE. ÄLÄ KATSO SÄTEESEEN.

ADVERSEL:
USYNLIG LASERSTRÅLING VED ÅBNING NÅR SIKKERHEDSAFBRYDERE ER UDE AF FUNKTION UNDGÅ UDSAETTELSE FOR STRÅLING.

VARNING!
OSYNLIG LASERSTRÅLNING NÄR DENNA DEL ÄR ÖPPNAD OCH SPÄRREN ÄR URKOPPLAD. BETRAKTA EJ STRÅLEN.

LASER
Kuva 1
Lasersateilyn
varoitusmerkki

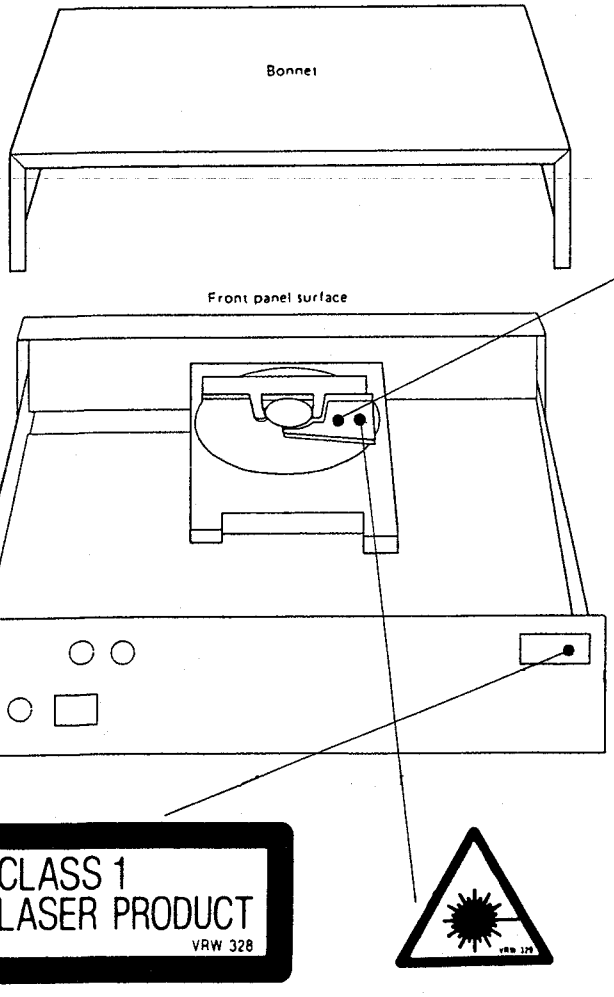
WARNING!
DEVICE INCLUDES LASER DIODE WHICH EMITS INVISIBLE INFRARED RADIATION WHICH IS DANGEROUS TO EYES. THERE IS A WARNING SIGN ACCORDING TO PICTURE 1 INSIDE THE DEVICE CLOSE TO THE LASER DIODE.

IMPORTANT
THIS PIONEER APPARATUS CONTAINS LASER OF HIGHER CLASS THAN 1. SERVICING OPERATION OF THE APPARATUS SHOULD BE DONE BY A SPECIALLY INSTRUCTED PERSON.

LASER DIODE CHARACTERISTICS
MAXIMUM OUTPUT POWER: 5 mw
WAVELENGTH: 780-785 nm

LASER
Picture 1
Warning sign for
laser radiation

LABEL CHECK



HEM model

HEM model

ADVARSEL
USYNLIG LASERSTRÅLING VED ÅBNING NÅR SIKKERHED SAFBRYDERE ER UDE AF FUNKTION.
UNDGÅ UDSÆTTELSE FOR STRÅLING.
VORSICHT!
UNSICHTBARE LASER-STRAHLUNG TRITT AUS, WENN DECKEL (ODER KLAPPE) GEÖFFNET IST! NICHT DEM STRAHL AUSSETZEN!
VRW1094

Additional Laser Caution

1. Laser Interlock Mechanism
   The ON/OFF status of the clamp switch (S102) for detecting loading completion is detected by the system microprocessor, and the design prevents laser diode oscillation when the clamp switch is OFF.
   Thus, the interlock will no longer function if the clamp switch (S102) is deliverately shorted.
   In the test mode the interlock mechanism will not function (refer to page 34).
   Laser diode oscillation will continue if pin 4, 5, or 29 of CXA1081S (ICI) is connected to ground or the terminals of Q1 are shorted to each other (fault condition).
2. If the fault condition described in 1 is induced with the cover removed and the objective lens extending past the outer circumference of the disc clamper diameter, close viewing of the objective lens with the naked eye will cause exposure to a Class 1 or higher laser beam.

2. EXPLODED VIEWS AND PARTS LIST

NOTES:

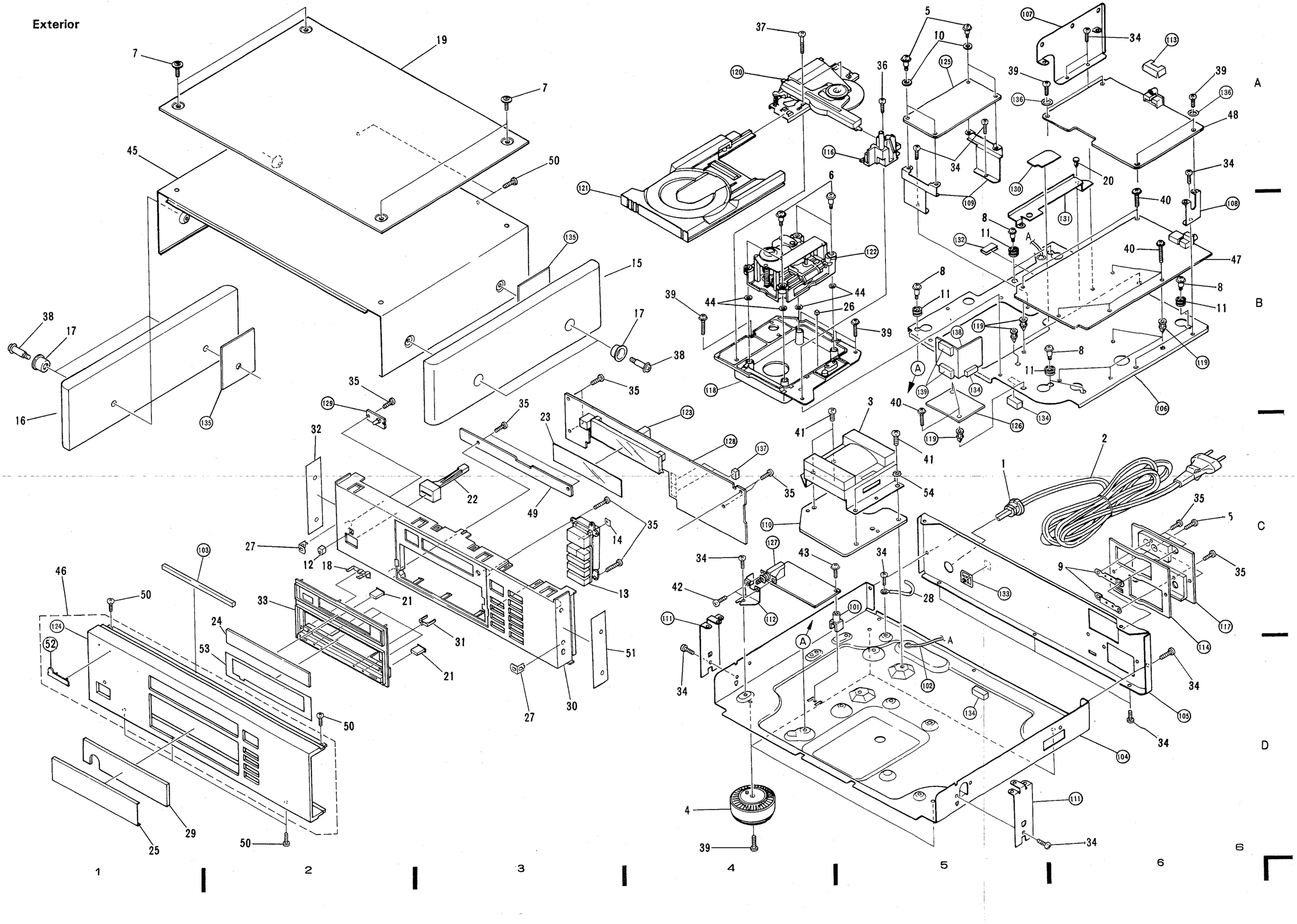
- *Parts without part number cannot be supplied.*
- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *Parts marked by "◉" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.*

2.1 EXTERIOR

Parts List of Exterior

Mark	No.	Parts No.	Description
	1	CM−22C	Strain relief (KU/CA type)
	1	CM−22B	Strain relief (HEM type)
⚠	2	PDG1015	AC Power cord (KU/CA type)
⚠	2	PDG1003	AC Power cord (HEM type)
⚠	3	PTT1159	Power transformer (KU/CA type)
⚠	3	PTT1160	Power transformer (HEM type)
	4	AMR1159	Leg assembly
	5	PBA1014	Screw (B)
	6	PBA1027	Screw
	7	PBA1033	SH screw
	8	PBA1034	Screw
	9	PBK1056	Earth plate
	10	PEB1109	Rubber stopper
	11	PEB1101	Mount rubber
	12	AMR1160	LED lens
	13	PAC1317	Play button
	14	PNW1258	Play lens
	15	PMM1018	Side wood (R) (KU/CA type)
	15	PMM1036	Side board R (HEM type)
	16	PMM1017	Side wood (L) (KU/CA type)
	16	PMM1035	Side board L (HEM type)
	17	PNW1238	Wood color
	18	PBK1068	Earth plate
	19	PAN1123	Top plate
	20	PBM−015	Plastic revet
	21	PAC1325	Select button
	22	PAC1326	Power knob
	23	PAM1290	FL sheet (KU/CA type)
	23	PAM1251	FL sheet (HEM type)
	24	PAM1252	Display window
	25	PAN1132	Door name plate
	26	PNM1078	Cushion
	27	PBK1061	Plate spring
	28	RNH−184	Cord clamper
	29	PNW1595	Name plate holder
	30	PNW1459	Function panel
	31	PNW1460	Lens A
	32	PAN1130	Side sash (L)
	33	PNW1490	Center panel
	34	BBZ30P060FCC	Screw
	35	BBZ30P080FCC	Screw
	36	IBZ30P100FCC	Screw
	37	BPZ30P250FMC	Screw
	38	PBA1038	Screw
	39	IBZ30P080FCC	Screw
	40	IBZ30P150FCU	Screw
	41	BBZ40P100FCC	Screw
	42	PMZ30P060FCU	Screw
	43	IPZ30P180FCU	Screw
	44	WC30FCU	Washer
	45	PYY1071	Bonnet
	46	PYY1139	Front panel assembly (KU/CA type)
	46	PYY1140	Front panel assembly (HEM type)
⊙	47	PWZ1768	MAIN BOARD assembly
⊙	48	PWZ1769	AUDIO BOARD assembly
⊙	49	PWZ1499	SUB FUNCTION BOARD assembly
	50	BBT30P080FCU	Screw
	51	PAN1131	Side sash (R)
	52	.....	Name plate
	53	PAM1360	Panel sheet
	54	WH40FUC	Washer
	101		PCB mold
	102		Lead wire assembly
	103		Spacer
	104		Under base
	105		Rear base
	106		Float base
	107		L angle
	108		S angle
	109		M angle
	110		Trans base
	111		Side angle
	112		Switch angle
	113		Shield cover
	114		Rear shield
	115		.....
	116		Slide guide
	117		Rear cover
	118		Mecha base
	119		PCB spacer
	120		Loading base assembly
	121		Tray assembly
	122		Servo mechanism assembly
	123		Cushion rubber
	124		Front panel
	125		POWER SUPPLY BOARD assembly
	126		SERVO POWER SUPPLY BOARD assembly
	127		PRIMARY BOARD assembly
	128		FUNCTION BOARD assembly
	129		LED BOARD assembly
	130		Cord fixer
	131		Bracket
	132		Tape
	133		Binder holder
	134		Spacer
	135		Wood spacer
	136		Washer
	137		Cushion (3.5)
	138		Shield plate
	139		Absorber rubber (B)

Exterior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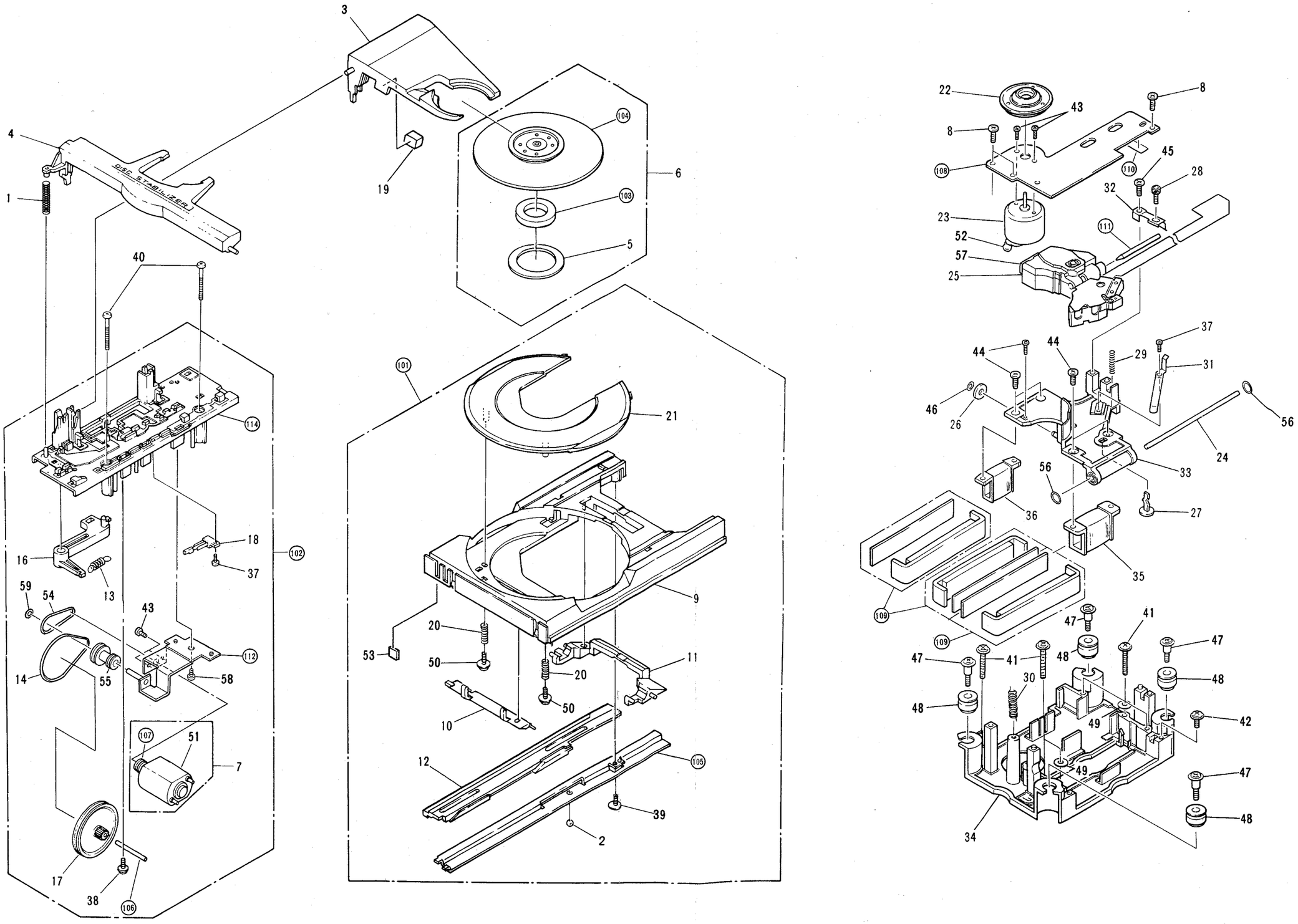
2.2 MECHANISM UNIT



Parts list of Mechanism unit

Mark	No.	Parts No.	Description
	1	PBH1013	Spring
	2	PBP−001	Steel ball ϕ4
	3	PNW1084	Clamp holder
	4	PNW1085	Clamp retainer
	5	PNM1010	Disc cushion
	6	PYY1084	Clamper assembly
	7	PYY1025	Motor assembly (LOADING)
	8	PBA1031	Screw
	9	PNW1627	Tray
	10	PNW1330	Plate lever (F)
	11	PNW1331	Plate lever (R)
	12	PNW1332	Rack
	13	PBH1012	Clamp spring
	14	PEB1013	Belt (LOADING)
	15	.....	.....
	16	PNW1083	Clamp lever
	17	PNW1171	Gear pully
	18	VSK−015	Leaf switch (CLAMP : S102)
	19	PEB1032	Stopper rubber
	20	PBH1045	Plate spring
	21	PNW1626	Disc plate
	22	PNW1064	Disc table
	23	PEA1086	Motor assembly
	24	PLA1061	Guide bar
	25	PWY1011	Pick−up assembly
	26	PNW1408	Roller
	27	PNW1407	Adjustment shaft
	28	PBA1026	Adjustment screw
	29	PBH1029	Shaft spring
	30	PBH1068	Earth spring
	31	PBK1045	Plate spring (T)
	32	PBK1046	Plate spring (R)
	33	PNW1405	Carriage
	34	PNW1406	Mechanism chassis
	35	PXP1003	Drive unit
	36	PXP1004	Detector unit
	37	BPZ20P080FZK	Screw
	38	IPZ30P050FZK	Screw
	39	PPZ30P080FMC	Screw
	40	BPZ30P250FMC	Screw
	41	IBZ30P180FMC	Screw
	42	IPZ30P080FMC	Screw
	43	PMZ20P030FMC	Screw
	44	PMZ26P040FMC	Screw
	45	PPZ26P080FMC	Screw
	46	WT25D047D025	Washer
	47	PBA1027	Screw
	48	PEB1031	Float rubber
	49	WA32F100M050	Washer
	50	PBA1025	Screw

Mark	No.	Parts No.	Description
	51	PXM1002	Motor (LOADING)
	52	CKDYF103Z50	Ceramic capacitor
	53	PNM1082	Spacer
	54	PEB1125	Belt
	55	PNW1594	Pully
	56	PEB1097	Rubber ring
	57	PNB1232	Weight
	58	PDZ30P050FMC	Screw
	59	WT26D047D050	Washer
	101		Tray assembly
	102		Loading base assembly
	103		Magnet
	104		Clamper
	105		Slide base
	106		Gear shaft
	107		Motor pully
	108		Base plate
	109		Yoke unit
	110		Absorber felt
	111		PU guide bar
	112		Pully angle
	113		.....
	114		Loading base

MOUNTING EACH COMPONENT

Mounting the disc table

To set the disc table, make sure to put the stopper below bottom of the spindle motor and apply pressure (about 9 kg) to the disc table.
The spacer (which is separated from the mechanical chassis) must also be inserted between the base plates as shown in figure 1.

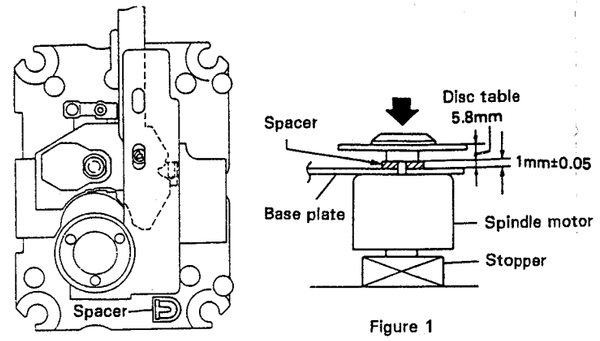


Figure 1

Precautions for mounting the pick−up assembly

1. Connect the lead wire from the linear motor as shown in figure 2.
2. When mounting the pick−up assembly, secure the tangential screw carefully as shown in figure 3, so that the adjustment shaft does not break.
3. Mount the P.U. guide driver carefully so that the spring does not jump out.

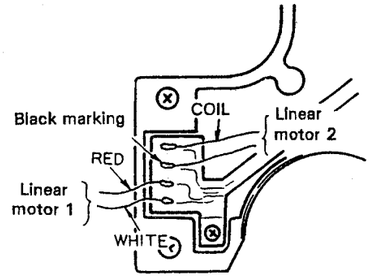


Figure 2

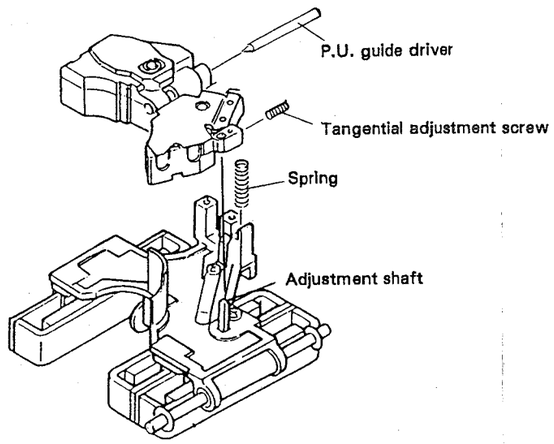
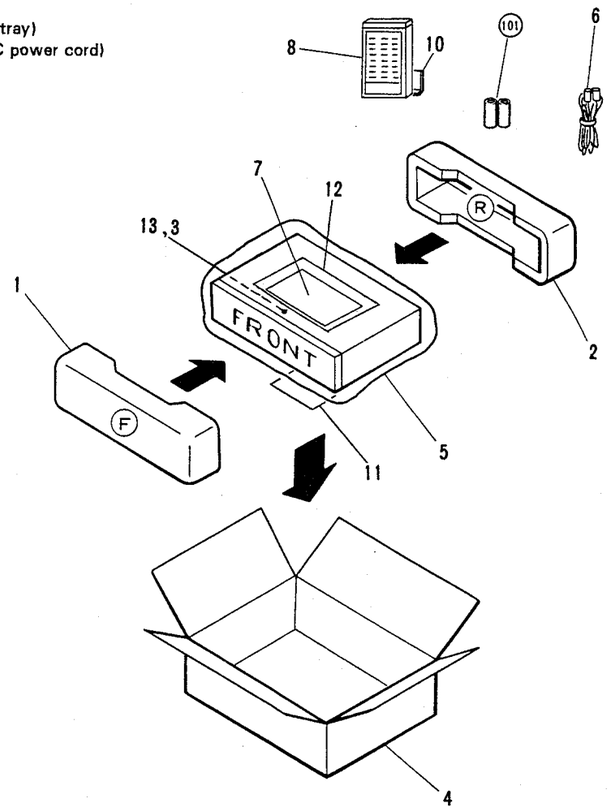


Figure 3

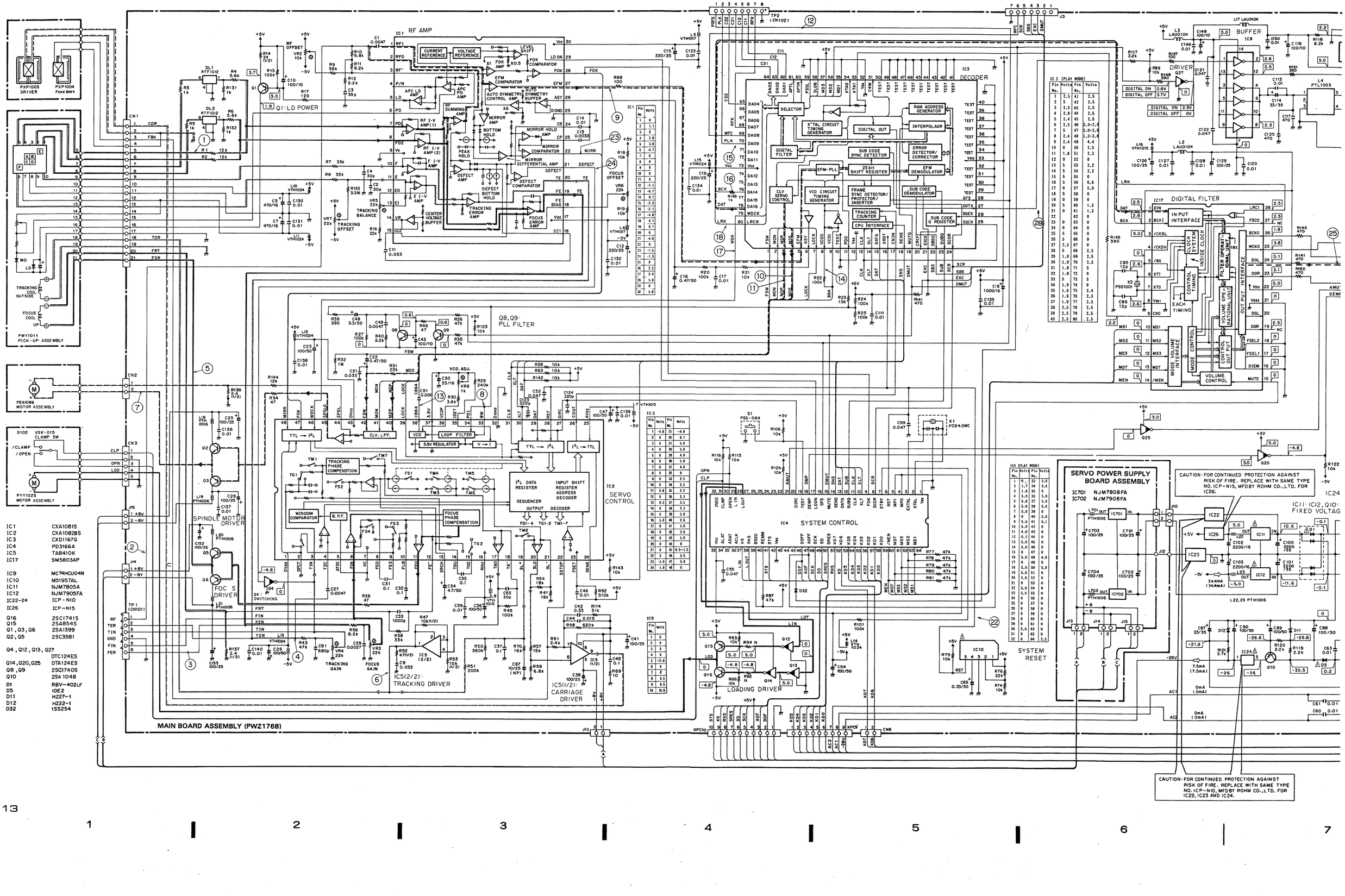
3. PACKING

Parts list of Packing

Mark	No.	Parts No.	Description
	1	PHA1095	Protector (F)
	2	PHA1096	Protector (R)
	3	PHC1030	Spacer(In the tray)
	4	PHG1503	Packing case (KU/CA type)
	4	PHG1502	Packing case (HEM type)
	5	VHL−037	Sheet
	6	PDE1003	Connection cord with pin plug
	7	PRB1129	Operating Instructions (English)(KU/CA type)
	7	PRE1129	Operating Instructions (English,French,German,Italian, Dutch,Swedish,Spanish, Portguese)(HEM type)
	8	PWW1037	Remote control unit
	9	.....	.....
	10	PNW1153	Battery cover
	11	PRM1016	Caution card
	12	Z21−038	Sheet
	13	PHC1022	Sheet (In the tray)
	14	Z21−013	Sheet (For AC power cord)
	101		Battry



4. SCHEMATIC DIAGRAM


RF AMP
DECODER
DIGITAL FILTER
SERVO CONTROL
SYSTEM CONTROL
BUFFER
DRIVER
Q8,Q9: PLL FILTER
IC5(2/2): TRACKING DRIVER
IC5(1/2): CARRIAGE DRIVER
LOADING DRIVER
SPINDLE MOTOR DRIVER
FOC S DRIVER
SERVO POWER SUPPLY BOARD ASSEMBLY
IC701 NJM7808FA
IC702 NJM7908FA
IC11: IC12, Q10: FIXED VOLTAG
SYSTEM RESET
MAIN BOARD ASSEMBLY (PWZ1768)
PXP1003 DRIVER
PXP1004 Feed Motor
PWY1011 PICK-UP ASSEMBLY
PEA1086 MOTOR ASSEMBLY
PYY1025 MOTOR ASSEMBLY
VSK-015 CLAMP SW
CAUTION: FOR CONTINUED PROTECTION AGAINST RISK OF FIRE. REPLACE WITH SAME TYPE NO. ICP-N15, MFD BY ROHM CO., LTD. FOR IC26.
CAUTION: FOR CONTINUED PROTECTION AGAINST RISK OF FIRE. REPLACE WITH SAME TYPE NO. ICP-N10, MFD BY ROHM CO., LTD. FOR IC22, IC23 AND IC24.

IC1	CXA1081S
IC2	CXA1082BS
IC3	CXD1167Q
IC4	P03166A
IC5	TA8410K
IC17	SM5803AP
IC9	MC74HCU04N
IC10	M51957AL
IC11	NJM7805A
IC12	NJM7905FA
IC22-24	ICP-N10
IC26	ICP-N15
Q16	2SC1741S
Q15	2SA854S
Q1,Q3,Q6	2SA1399
Q2,Q5	2SC3581
Q4,Q12,Q13,Q27	DTC124ES
Q14,Q20,Q25	DTA124ES
Q8,Q9	2SCI740S
Q10	2SA1048
D1	RBV-402LF
D5	10E2
D11	HZ27-1
D12	HZ22-1
D32	1SS254

7 8 9 10 11 12

FOCUS SERVO LOOP LINE
SIGNAL ROUTE
TRACKING SERVO LOOP LINE
CARRIAGE SERVO LINE
LOADING MOTOR LINE
SPINDLE SERVO ROUTE

1. RESISTORS:
Indicated in Ω, ¼W, ⅛W, ±5% tolerance unless otherwise noted k : kΩ, M : MΩ, (F) : ±1%, (G) : ±2%, (K) : ±10% (M) ; ±20% tolerance

2. CAPACITORS:
Indicated in capacity (μF)/voltage (V) unless otherwise noted p : pF
Indication without voltage is 50V except electrolytic capacitor.

3. VOLTAGE, CURRENT:
: DC voltage (V) at no input signal

4. OTHERS:
➡ : Signal route.
⊘ : Adjusting point.
The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
※ marked capacitors and resistors have parts numbers.

This is the basic schematic diagram, but the actual circuit may vary due to improvements in design.

SWITCHES:
MAIN BOARD ASSEMBLY
S1 TACT SW
PRIMARY BOARD ASSEMBLY
S301 POWER SW ON–OFF
FUNCTION BOARD ASSEMBLY
S213,214 TACT SW
S233–236 TACT SW

▶ADJUSTMENT POINT

IC613	NJM7812FA		
IC614	NJM7912FA	Q617 , Q622	2SB857
IC615	NJM5532DD	Q619 , Q624	2SD1133
IC620 , IC621	ICP-N10	Q620 , Q618	2SD755
		Q621 , Q623	2SB715
D620 ∿ D627	10DF2	Q625	2SA933S
D628 ∿ D631	HZ5CLL	Q626	2SC1740S

IC500, IC501 PCM63P-K
IC502, IC503 NJM5532DD
IC504 NJM7805FA
IC505 NJM7905FA
IC506, IC507 NJM2068DD
Q500,Q501,Q514,Q515 2SK364GR
Q502,Q503,Q516,Q517 2SJ104GR
Q512,Q513,Q520,Q521 2SC3068S
Q522 DTC124ES
D511 ∿ D513 1SS254

AUDIO BOARD ASSEMBLY (PWZ1769)

FUNCTION BOARD ASSEMBLY

SUB FUNCTION BOARD ASSEMBLY (PWZ1499)

POWER SUPPLY BOARD ASSEMBLY

PRIMARY BOARD ASSEMBLY

LED BOARD ASSEMBLY

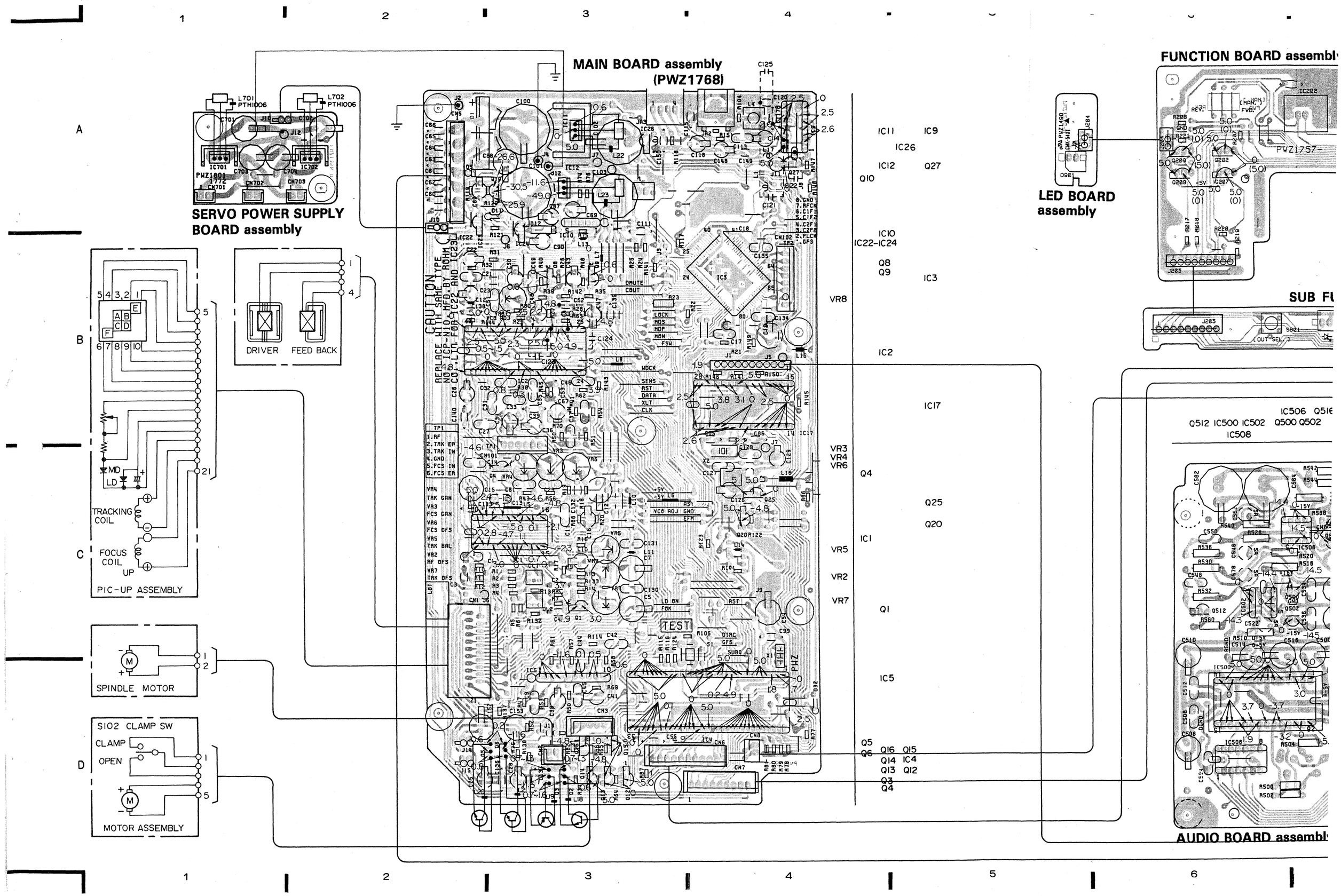
IC201 PDG036 GP1U52X
REMOTE CONTROL UNIT
V201 PEL1025
Q204 2SC1740S
Q201 , Q202,
Q207 ∿ Q209
DTA124ES
D201 SLH-56MC3H
S213 , S214
S233 ∿ S236
PDG-065
D801 , D803 : SLH-34YC3H3 (YEL)
D802 , D804 : SLH-34VC3H3 (RED)
S801, S802 : PSG-065
D901 SLH-56VC3H (RED)

CAUTION: FOR CONTINUED PROTECTION AGAINST RISK OF FIRE. REPLACE WITH SAME TYPE NO. ICP-N15, MFD BY ROHM CO., LTD. FOR IC26.

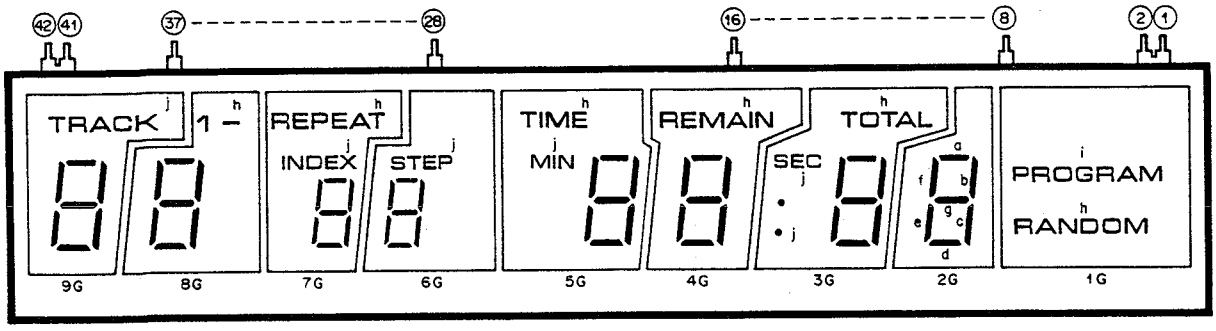
CAUTION: FOR CONTINUED PROTECTION AGAINST RISK OF FIRE. REPLACE WITH SAME TYPE NO. ICP-N10, MFD BY ROHM CO., LTD. FOR IC620 AND IC621.

CAUTION: FOR CONTINUED PROTECTION AGAINST RISK OF FIRE. REPLACE WITH SAME TYPE NO. ICP-N10, MFD BY ROHM CO., LTD. FOR IC22, IC23 AND IC24.

A B C D


SERVO POWER SUPPLY BOARD assembly
L701 PTH1006
L702 PTH1006
IC701
IC702
PWZ1801 1772
CN701
CN702
CN703
MAIN BOARD assembly (PWZ1768)
CAUTION REPLACE WITH SAME TYPE NO. LCP-N10 MFD. BY ROHM C22 AND C23
TEST
IC11 IC9
IC26
IC12 Q27
Q10
IC10
IC22-IC24
Q8
Q9
IC3
VR8
IC2
IC17
VR3
VR4
VR6
Q4
Q25
Q20
IC1
VR5
VR2
VR7
Q1
IC5
Q5
Q6 Q16 Q15
Q14 IC4
Q13 Q12
Q3
Q4
LED BOARD assembly
FUNCTION BOARD assembly
PWZ1757
SUB FU
IC506 Q516
Q512 IC500 IC502 Q500 Q502
IC508
AUDIO BOARD assembl
DRIVER
FEED BACK
MD
LD
TRACKING COIL
FOCUS COIL
UP
PIC-UP ASSEMBLY
SPINDLE MOTOR
S102 CLAMP SW
CLAMP
OPEN
MOTOR ASSEMBLY

FL TUBE (PEL1025)



PIN CONNECTION

PIN NO.	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
CONNECTION	F2	F2	NP	NP	NP	d	c	e	h	g	f	b	a	j	i	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	9G	8G	7G	6G	5G	4G	3G	2G	1G	NP	NP	NP	NP	NP	F1	F1

LINE VOLTAGE SELECTION

Line voltage can be changed with the following steps.

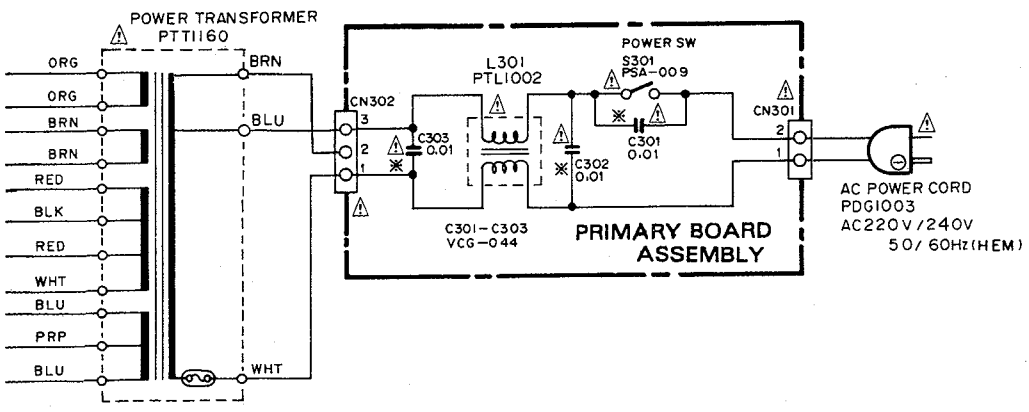
1. Disconnect the AC power cord.
2. Remove the top cover.
3. Change the transformer wire of terminal CN302–② and CN302–③ as follows.

Voltage	Terminal No.CN302–②	Terminal No.CN302–③
220V	PURPLE	BLUE
240V	BLUE	PURPLE

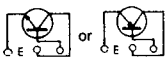
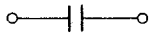
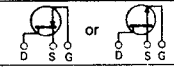
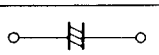
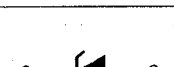
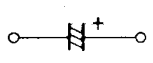
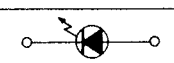
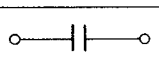
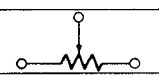
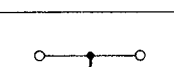
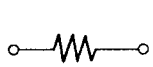
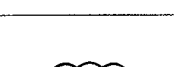
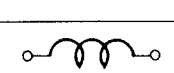
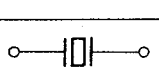
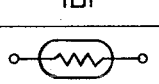
4. Stick the line voltage label on the rear panel.

Part No.	Description
AAX–193	220V label
AAX–192	240V label

FOR HEM TYPE

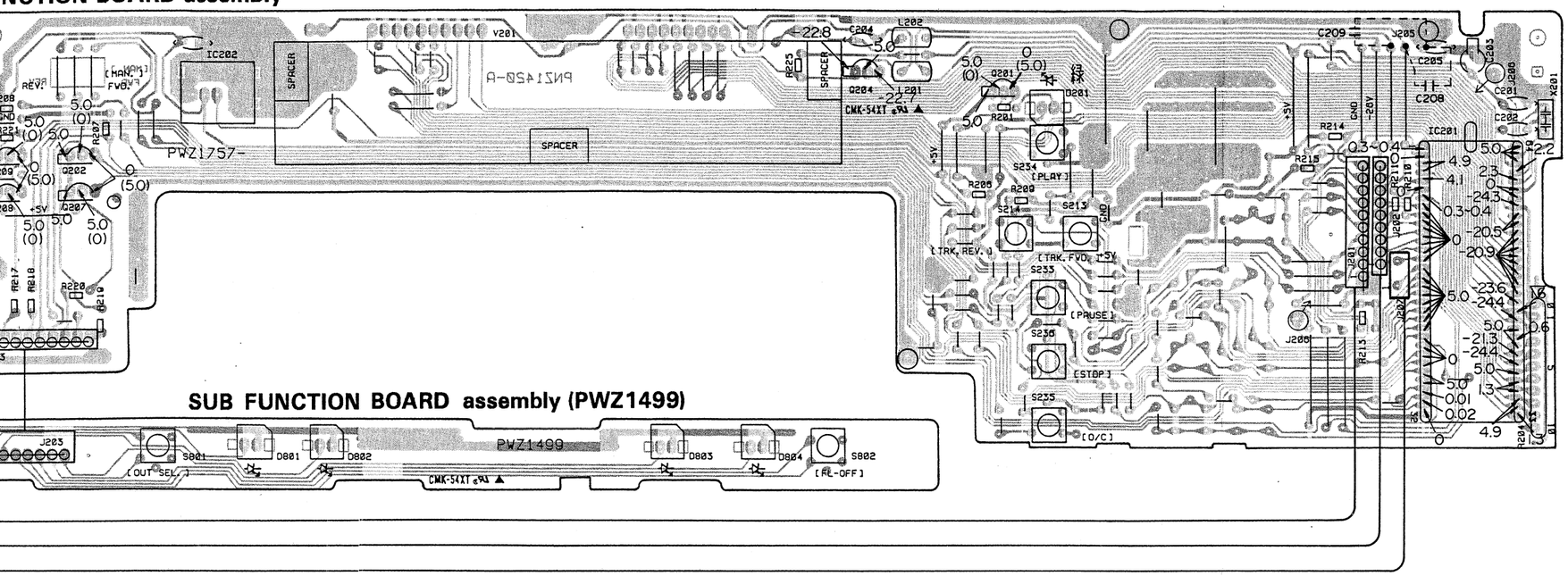


5. P.C.BOARD CONNECTION DIAGRAM

P.C.B. pattern diagram indication	Corresponding part symbol	Part name	P.C.B. pattern diagram indication	Corresponding part symbol	Part name
		Transistor			Ceramic capacitor
		FET			Mylar capacitor
		Diode			Styrol capacitor
					Electrolytic capacitor (Non polarized)
					Electrolytic capacitor (Noiseless)
		Zenner diode			Electrolytic capacitor (Polarized)
					Electrolytic capacitor (Polarized)
		LED			Power capacitor
		Varactor			Semi-fixed resistor
		Tact switch			Resistor array
					Resistor
		Inductor			
		Coil			Resonator
		Transformer			Thermistor
		Filter			

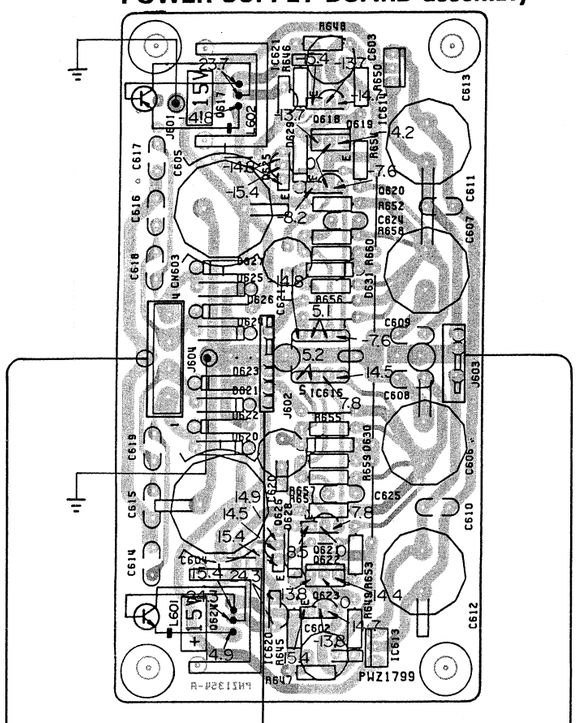
1. This P.C.B. connection diagram is viewed from the parts mounted side.
2. The parts which have been mounted on the board can be replaced with those shown with the corresponding wiring symbols listed in the above Table.
3. The capacitor terminal marked with ▭ shows negative terminal.
4. The diode marked with ○ shows cathode side.
5. The transistor terminal marked with ▭ shows emitter.

NCTION BOARD assembly

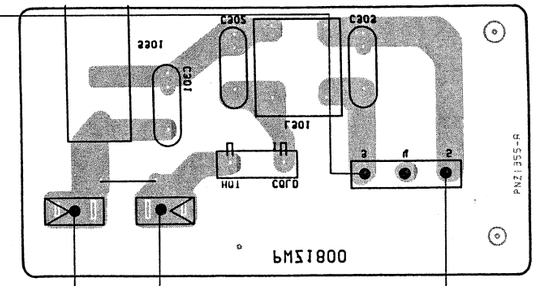


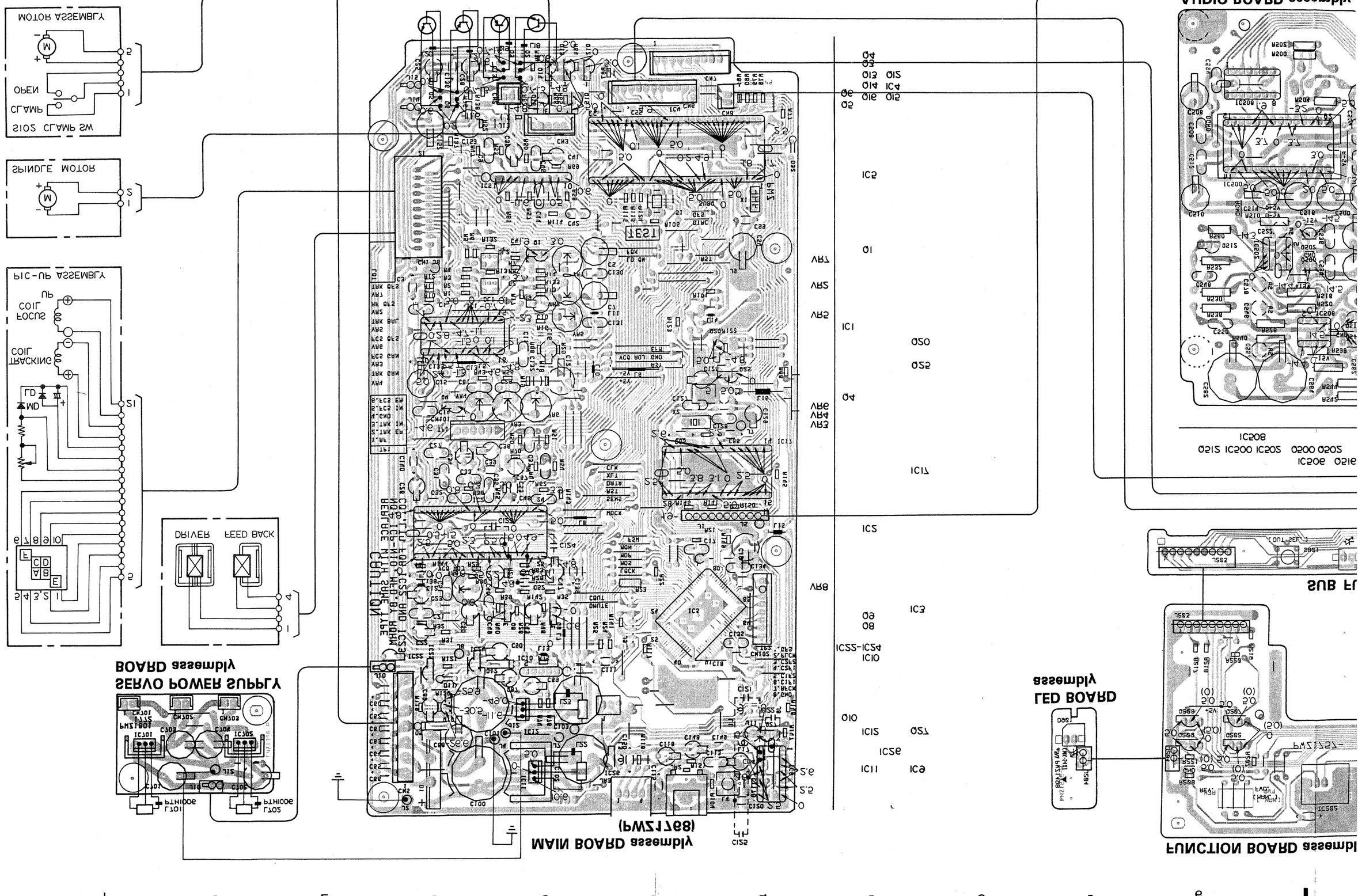
SUB FUNCTION BOARD assembly (PWZ1499)

POWER SUPPLY BOARD assembly



PRIMARY BOARD assembly

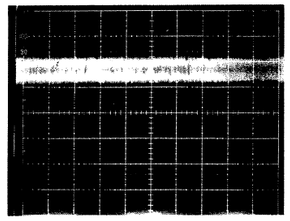



MOTOR ASSEMBLY
SIOS CLAMP SW
CLAMP
OPEN
SPINDLE MOTOR
PIC-UP ASSEMBLY
FOCUS COIL
TRACKING COIL
LD
PD
SERVO POWER SUPPLY
BOARD assembly
DRIVER
FEED BACK
MAIN BOARD assembly
(8T12W)
AUDIO BOARD assembly
IC200 IC201 IC202 IC203 IC204
IC205
SUB FUNCTION BOARD assembly
LED BOARD assembly

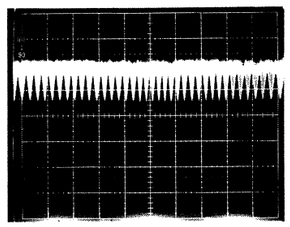
Wave Forms

NOTE : The encircled numbers denote measuring points in the schematic diagram.

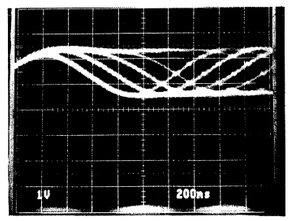
① CN1-5 Pin : PLAY MODE
50mV/div 5msec/div



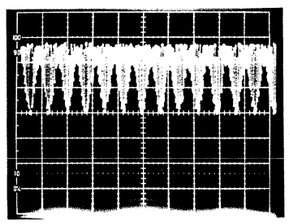
① CN11-5 Pin : SEARCH MODE
50mV/div 5msec/div



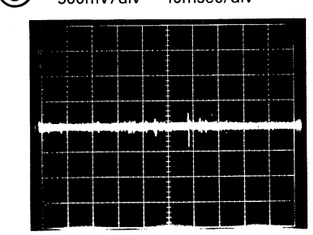
② TP1-1 Pin : PLAY MODE
1V/div 200nsec/div



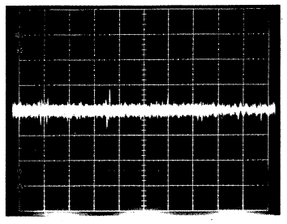
② TP1-1 Pin : SEARCH MODE
500mV/div 100μsec/div



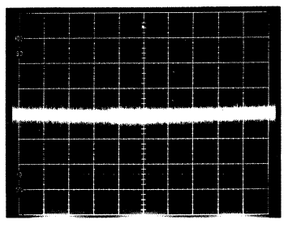
③ TP1-6 Pin : PLAY MODE
500mV/div 10msec/div



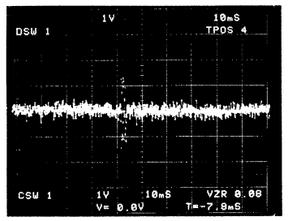
③ TP1-6 Pin : SEARCH MODE
500mV/div 10msec/div



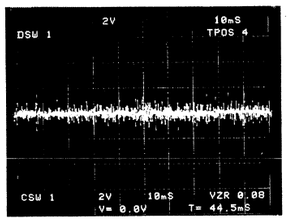
④ TP1-2 Pin : PLAY MODE
1V/div 10msec/div



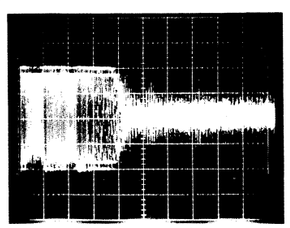
④ TP1-2 Pin : SEARCH MODE
1V/div 10msec/div



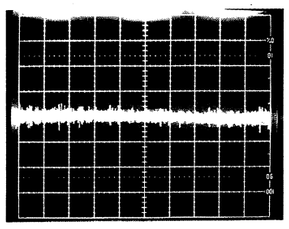
⑤ Q5 Emitter : PLAY MODE
2V/div 10msec/div



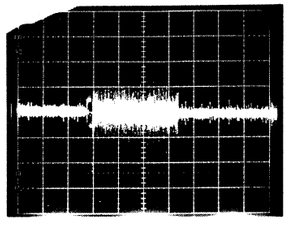
⑤ Q5 Emitter : SEARCH MODE
2V/div 10msec/div



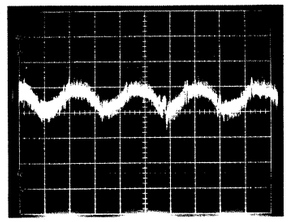
⑥ IC5-1 Pin : PLAY MODE
2V/div 10msec/div



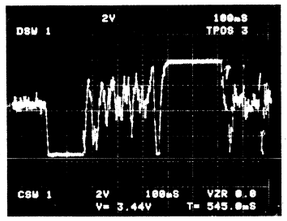
⑥ IC5-1 Pin : SEARCH MODE
2V/div 10msec/div



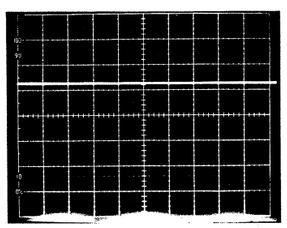
⑦ Q2 Emitter : PLAY MODE
2V/div 50msec/div



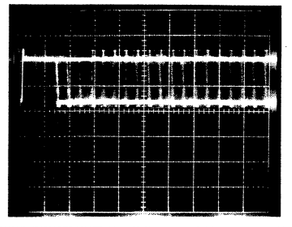
⑦ Q2 Emitter : SEARCH MODE
2V/div 100msec/div



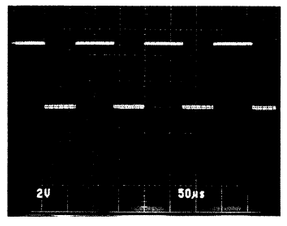
⑧ IC2-33, 34 Pin : PLAY MODE
2V/div 10msec/div



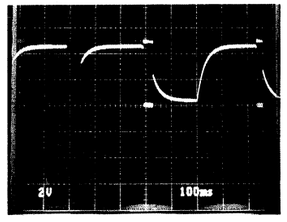
⑨ IC1-27 Pin : PLAY MODE
2V/div 500nsec/div



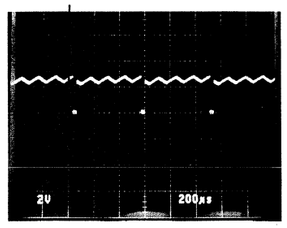
⑩ IC3-4 Pin : PLAY MODE
2V/div 50μsec/div



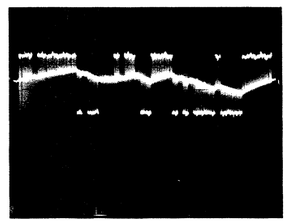
⑩ IC3-4 Pin : SEARCH MODE
2V/div 100msec/div



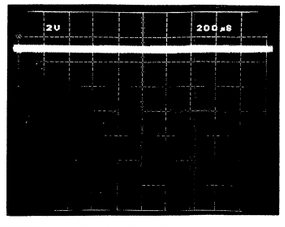
⑪ IC3-3 Pin : PLAY MODE
2V/div 200μsec/div



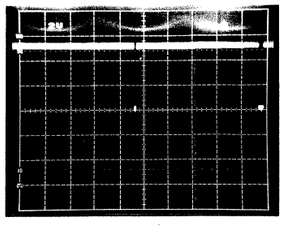
⑪ IC3-3 Pin : SEARCH MODE
2V/div 10msec/div



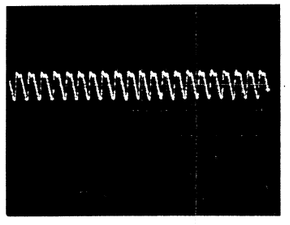
⑫ TP2-1 Pin : PLAY MODE
2V/div 200μsec/div



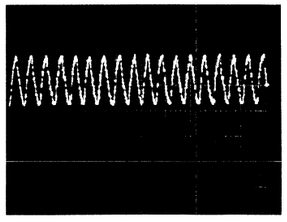
⑫ TP2-1 Pin : SEARCH MODE
2V/div 20msec/div



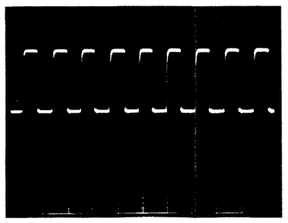
⑬ IC2-38 Pin : PLAY MODE
2V/div 200nsec/div



⑭ IC3-8 Pin : PLAY MODE
2V/div 200nsec/div

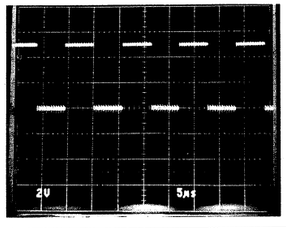


⑮ TP2-2 Pin : PLAY MODE
2V/div 200nsec/div

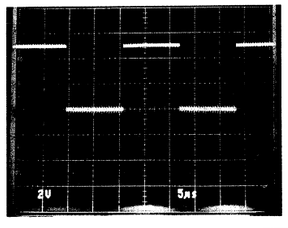


⑯ IC3-76 Pin : STOP MODE
2V/div 200nsec/div

⑰ IC3-79 Pin : STOP MODE
2V/div 5μsec/div



⑱ IC3-80 Pin : STOP MODE
2V/div 5μsec/div



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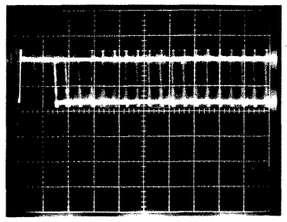
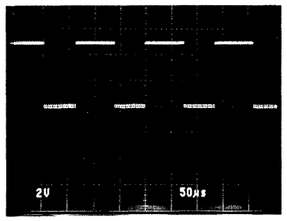
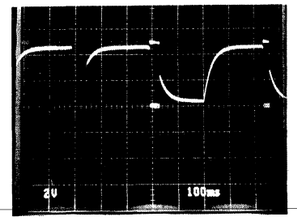
⑨ IC1-27 Pin : PLAY MODE
2V/div 500nsec/div



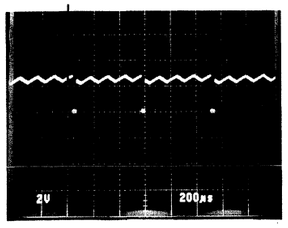
⑩ IC3-4 Pin : PLAY MODE
2V/div 50μsec/div



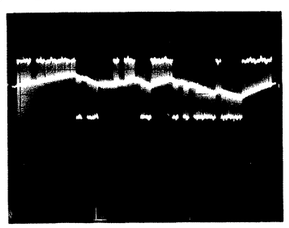
⑩ IC3-4 Pin : SEARCH MODE
2V/div 100msec/div



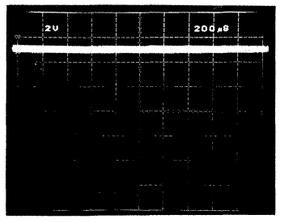
⑪ IC3-3 Pin : PLAY MODE
2V/div 200μsec/div



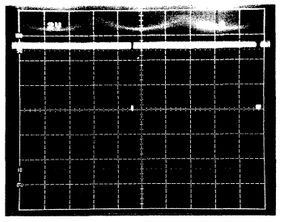
⑪ IC3-3 Pin : SEARCH MODE
2V/div 10msec/div



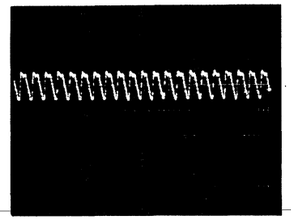
⑫ TP2-1 Pin : PLAY MODE
2V/div 200μsec/div



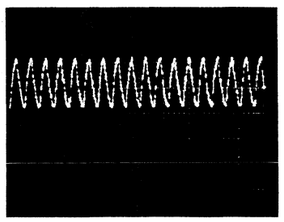
⑫ TP2-1 Pin : SEARCH MODE
2V/div 20msec/div



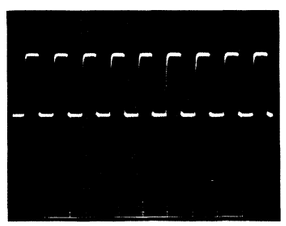
⑬ IC2-38 Pin : PLAY MODE
2V/div 200nsec/div



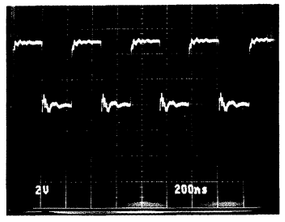
⑭ IC3-8 Pin : PLAY MODE
2V/div 200nsec/div



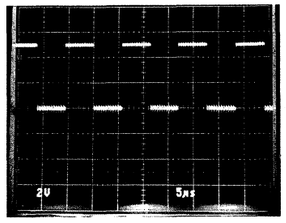
⑮ TP2-2 Pin : PLAY MODE
2V/div 200nsec/div



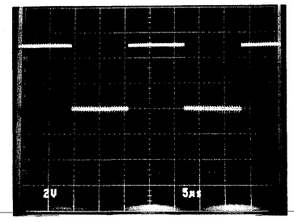
⑯ IC3-76 Pin : STOP MODE
2V/div 200nsec/div



⑰ IC3-79 Pin : STOP MODE
2V/div 5μsec/div

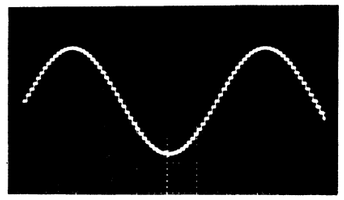


⑱ IC3-80 Pin : STOP MODE
2V/div 5μsec/div

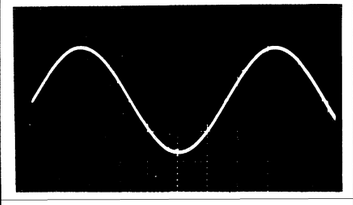


⑲

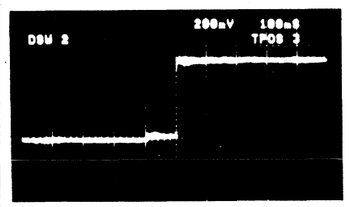
⑳ Q500 **Source** : PLAY MODE
2V/div 50μsec/div



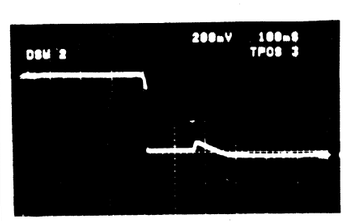
㉑ OUTPUT Lch : PLAY MODE
2V/div 50μsec/div



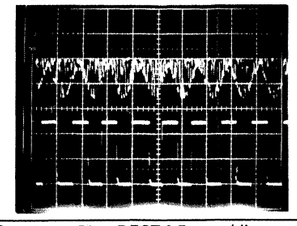
㉒ IC10-5 Pin : POWER ON
2V/div 100msec/div



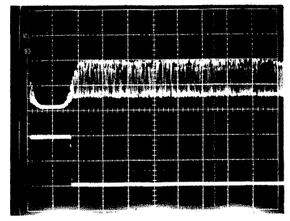
㉒ IC10-5 Pin : POWER OFF
2V/div 100msec/div



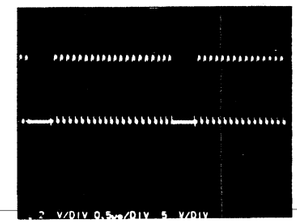
㉓ IC1-22 Pin : TRACKING OPEN
0.1msec/div
Upper TP1-1 Pin : 1V/div
Lower IC1-22 Pin : 2V/div



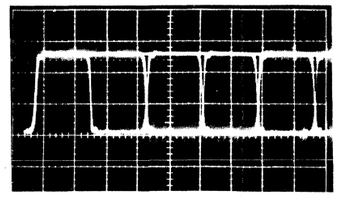
㉔ IC1-21 Pin : DFCT 0.5msec/div
Upper TP1-1 Pin : 1V/div
Lower IC1-21 Pin : 5V/div



㉕ IC17-24 Pin : STOP MODE
2V/div 0.5μsec/div



㉘ IC9-1 Pin : DOTX
2V/div 50nsec/div



6. P.C.B 's PARTS LIST

NOTES:

- *Parts without part number cannot be supplied.*
- *Parts marked by "◉" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.*
- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *When ordering resistors, first convert resistance values into code form as shown in the following examples.*

Ex. 1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J = 5%, and K = 10%).

560Ω	*56 × 10¹*	*561*	*RD1/4PS 5 6 1 J*
47kΩ	*47 × 10³*	*473*	*RD1/4PS 4 7 3 J*
0.5Ω	*0R5*		*RN2H 0 R 5 K*
1Ω	*010*		*RS1P 0 1 0 K*

Ex. 2 When there are 3 effective digits (such as in high precision metal film resistors).

5.62kΩ	*562 × 10¹*	*5621*	*RN1/4SR 5 6 2 1 F*

Mark	No.	Description	Parts No.
LED BOARD ASSEMBLY			
SEMICONDUCTORS			
	D901	LED WITH HOLDER	SLH−56VC3H
◉ SUB FUNCTION BOARD ASSEMBLY (PWZ1499)			
SEMICONDUCTORS			
	D801,803	LED WITH HOLDER	SLH−34YC3H3
	D802,804	LED WITH HOLDER	SLH−34VC3H3
SWITCHES			
	S801,802	TACT SW	PSG−065
FUNCTION BOARD ASSEMBLY			
SEMICONDUCTORS			
	IC201	FL UCOM	PDG036
	Q201,202	TRANSISTOR	DTA124ES
	Q204	TRANSISTOR	2SC1740S
	Q207−209	TRANSISTOR	DTA124ES
	D201	LED WITH HOLDER	SLH−56MC3H
SWITCHES			
	S213,214	TACT SW	PSG−065
	S233−236	TACT SW	PSG−065
COILS			
	L201	RADIAL INDUCTOR	LRA010K
	L202	COIL (1UH)	LRA010K
CAPACITORS			
	C201,202	CERAMIC CAPACITOR	CKCYF473Z50
	C203	ELECTR. CAPACITOR	CEAS330M16
	C204	CERAMIC CAPACITOR	CKCYF103Z50
	C205	CERAMIC CAPACITOR	CKCYF473Z50
	C208,209	CERAMIC CAPACITOR	CKCYF473Z50

Mark	No.	Description	Parts No.
RESISTORS			
	R204	RESISTOR ARRAY	RA10S473J
		Other resistors	RD1/6PM□□□J
OTHERS			
	V201	FL TUBE	PEL1025
	X201	CERAMIC RESONATOR	VSS1014
		REMOTE RECEIVER UNIT	GP1U52X
◉ MAIN BOARD ASSEMBLY (PWZ1768)			
SEMICONDUCTORS			
	IC1		CXA1081S
⚠	IC10	IC	M51957AL
⚠	IC11	REGULATOR IC	NJM7805A
⚠	IC12	REGULATOR IC	NJM7905FA
	IC17	DIGITAL FILTER	SM5803AP
	IC2	SERVO CONT. IC	CXA1082BS
⚠	IC22−24	IC PROTECTOR	ICP−N10
⚠	IC26	IC PROTECTOR	ICP−N15
	IC3	EFM DE−MODULATION IC	CXD1167Q
	IC4	UCOM	PD3166A
⚠	IC5	OP−AMP	TA8410K
	IC9	LOGIC IC	MC74HCU04N
	Q1	TRANSISTOR	2SA1399
	Q10	TRANSISTOR	2SA1048
	Q12,13	TRANSISTOR	DTC124ES
	Q14	TRANSISTOR	DTA124ES
	Q15	TRANSISTOR	2SA854S
	Q16	TRANSISTOR	2SC1741S
	Q2	TRANSISTOR	2SC3581
	Q20	TRANSISTOR	DTA124ES
	Q25	TRANSISTOR	DTA124ES
	Q27	TRANSISTOR	DTC124ES

Mark	No.	Description	Parts No.
	Q3	TRANSISTOR	2SA1399
	Q4	TRANSISTOR	DTC124ES
	Q5	TRANSISTOR	2SC3581
	Q6	TRANSISTOR	2SA1399
	Q8,9	TRANSISTOR	2SC1740S
⚠	D1	BRIDGE DIODE	RBV−402LF
⚠	D11	ZENER DIODE	HZ27−1
⚠	D12	ZENER DIODE	HZ22−1
	D32	DIODE	1SS254
⚠	D5	DIODE	10E2
COILS			
	L1	AXIAL INDUCTOR	LAV010K
	L10−15	FERRITE BEAD	VTH1024
	L16	FERRITE BEAD	VTH1015
	L17	AXIAL INDUCTOR	LAU010K
	L18−23		PTH1006
	L2	AXIAL INDUCTOR	LAU010K
	L3	AXIAL INDUCTOR	LAU010K
	L4	PULSE TRANS	PTL1003
	L5,6	FERRITE BEAD	VTH1017
	L7,8	FERRITE BEAD	VTH1015
SWITCHES			
	S1	TACT SW	PSG−064
CAPACITORS			
	C1	AUDIO FILM CAPACITOR	CFTXA472J50
	C10	ELECTR. CAPACITOR	CEAS101M10
	C100,101	ELECTR. CAPACITOR	CENA222M35
	C102,103	ELECTR. CAPACITOR	CENA222M16
	C11	AUDIO FILM CAPACITOR	CFTXA333J50
	C111	CERAMIC CAPACITOR	CKCYF103Z50
	C113	AUDIO FILM CAPACITOR	CFTXA103J50
	C114	ELECTR. CAPACITOR	CEAS330M35
	C115	CERAMIC CAPACITOR	CKCYF473Z50
	C117	CERAMIC CAPACITOR	CCCSL471J50
	C118	ELECTR. CAPACITOR	CEAS101M10
	C12	ELECTR. CAPACITOR	CEAS221M25
	C120	CERAMIC CAPACITOR	CKDYF103Z50
	C121,122	CERAMIC CAPACITOR	CKDYF473Z50
	C123,124	CERAMIC CAPACITOR	CCDSL221J50
	C125	CERAMIC CAPACITOR	CCDSL471J50
	C126	ELECTR. CAPACITOR	CENA101M25
	C127,128	AUDIO FILM CAPACITOR	CFTXA103J50
	C129	ELECTR. CAPACITOR	CENA101M25
	C13	AUDIO FILM CAPACITOR	CFTXA332J50
	C130,131	AUDIO FILM CAPACITOR	CFTXA103J50
	C132,133	CERAMIC CAPACITOR	CKCYF103Z50
	C134,135	AUDIO FILM CAPACITOR	CFTXA103J50

Mark	No.	Description	Parts No.
	C136−139	CERAMIC CAPACITOR	CKCYF103Z50
	C14	AUDIO FILM CAPACITOR	CFTXA103J50
	C140	CERAMIC CAPACITOR	CKCYF103Z50
	C148	ELECTR. CAPACITOR	CEAS101M10
	C149	CERAMIC CAPACITOR	CKCYF103Z50
	C15	ELECTR. CAPACITOR	CEAS221M25
	C150	CERAMIC CAPACITOR	CKCYF103Z50
	C152,153	ELECTR. CAPACITOR	CENA101M25
	C16	ELECTR. CAPACITOR	CEASR47M50
	C17	AUDIO FILM CAPACITOR	CFTXA103J50
	C18	ELECTR. CAPACITOR	CEAS102M16
	C19	ELECTR. CAPACITOR	CENA221M25
	C2	CERAMIC CAPACITOR	CCCCH300J50
	C21	AUDIO FILM CAPACITOR	CFTXA333J50
	C22	ELECTR. CAPACITOR	CEASR47M50
	C23	ELECTR. CAPACITOR	CEAS101M50
	C25	ELECTR. CAPACITOR	CENA101M25
	C26	ELECTR. CAPACITOR	CEAS101M50
	C27	AUDIO FILM CAPACITOR	CFTXA472J50
	C28	ELECTR. CAPACITOR	CENA101M25
	C29	AUDIO FILM CAPACITOR	CFTXA272J50
	C3	CERAMIC CAPACITOR	CCCCH390J50
	C31,32	AUDIO FILM CAPACITOR	CFTXA104J50
	C33	AUDIO FILM CAPACITOR	CFTXA102J50
	C34	ELECTR. CAPACITOR	CEAS4R7M50
	C35	AUDIO FILM CAPACITOR	CFTXA104J50
	C36	ELECTR. CAPACITOR	CEAS101M50
	C37	AUDIO FILM CAPACITOR	CFTXA104J50
	C38	ELECTR. CAPACITOR	CENA101M25
	C39	CERAMIC CAPACITOR	CKCYF103Z50
	C4	CERAMIC CAPACITOR	CCCCH300J50
	C41	ELECTR. CAPACITOR	CENA101M25
	C42	AUDIO FILM CAPACITOR	CFTXA334J50
	C43	ELECTR. CAPACITOR	CEAS101M10
	C44	AUDIO FILM CAPACITOR	CFTXA153J50
	C45	AUDIO FILM CAPACITOR	CFTXA104J50
	C46	AUDIO FILM CAPACITOR	CFTXA103J50
	C47	ELECTR. CAPACITOR	CEAS101M50
	C48	ELECTR. CAPACITOR	CEAS3R3M50
	C49	AUDIO FILM CAPACITOR	CFTXA472J50
	C5	ELECTR. CAPACITOR	CENA471M16
	C50	ELECTR. CAPACITOR	CEAS330M16
	C51	AUDIO FILM CAPACITOR	CFTXA102J50

Mark	No.
	C52
	C53
	C54
	C55
	C60−6
	C67
	C69
	C7
	C81
	C85,86
	C87
	C88,89
	C9
	C90
	C99
RESISTORS	
	VR2
	VR3−7
	VR8
	R137,1
	R14
	R23
	R30
	R47
	R52
	R53
OTHERS	
	CN1
	CN6
	CN7
	DL1,2
	JA2
	JA3
	X1
	X2

Mark	No.	Description	Parts No.
	Q3	TRANSISTOR	2SA1399
	Q4	TRANSISTOR	DTC124ES
	Q5	TRANSISTOR	2SC3581
	Q6	TRANSISTOR	2SA1399
	Q8,9	TRANSISTOR	2SC1740S
⚠	D1	BRIDGE DIODE	RBV−402LF
⚠	D11	ZENER DIODE	HZ27−1
⚠	D12	ZENER DIODE	HZ22−1
	D32	DIODE	1SS254
⚠	D5	DIODE	10E2
COILS			
	L1	AXIAL INDUCTOR	LAV010K
	L10−15	FERRITE BEAD	VTH1024
	L16	FERRITE BEAD	VTH1015
	L17	AXIAL INDUCTOR	LAU010K
	L18−23		PTH1006
	L2	AXIAL INDUCTOR	LAU010K
	L3	AXIAL INDUCTOR	LAU010K
	L4	PULSE TRANS	PTL1003
	L5,6	FERRITE BEAD	VTH1017
	L7,8	FERRITE BEAD	VTH1015
SWITCHES			
	S1	TACT SW	PSG−064
CAPACITORS			
	C1	AUDIO FILM CAPACITOR	CFTXA472J50
	C10	ELECTR. CAPACITOR	CEAS101M10
	C100,101	ELECTR. CAPACITOR	CENA222M35
	C102,103	ELECTR. CAPACITOR	CENA222M16
	C11	AUDIO FILM CAPACITOR	CFTXA333J50
	C111	CERAMIC CAPACITOR	CKCYF103Z50
	C113	AUDIO FILM CAPACITOR	CFTXA103J50
	C114	ELECTR. CAPACITOR	CEAS330M35
	C115	CERAMIC CAPACITOR	CKCYF473Z50
	C117	CERAMIC CAPACITOR	CCCSL471J50
	C118	ELECTR. CAPACITOR	CEAS101M10
	C12	ELECTR. CAPACITOR	CEAS221M25
	C120	CERAMIC CAPACITOR	CKDYF103Z50
	C121,122	CERAMIC CAPACITOR	CKDYF473Z50
	C123,124	CERAMIC CAPACITOR	CCDSL221J50
	C125	CERAMIC CAPACITOR	CCDSL471J50
	C126	ELECTR. CAPACITOR	CENA101M25
	C127,128	AUDIO FILM CAPACITOR	CFTXA103J50
	C129	ELECTR. CAPACITOR	CENA101M25
	C13	AUDIO FILM CAPACITOR	CFTXA332J50
	C130,131	AUDIO FILM CAPACITOR	CFTXA103J50
	C132,133	CERAMIC CAPACITOR	CKCYF103Z50
	C134,135	AUDIO FILM CAPACITOR	CFTXA103J50

Mark	No.	Description	Parts No.
	C136−139	CERAMIC CAPACITOR	CKCYF103Z50
	C14	AUDIO FILM CAPACITOR	CFTXA103J50
	C140	CERAMIC CAPACITOR	CKCYF103Z50
	C148	ELECTR. CAPACITOR	CEAS101M10
	C149	CERAMIC CAPACITOR	CKCYF103Z50
	C15	ELECTR. CAPACITOR	CEAS221M25
	C150	CERAMIC CAPACITOR	CKCYF103Z50
	C152,153	ELECTR. CAPACITOR	CENA101M25
	C16	ELECTR. CAPACITOR	CEASR47M50
	C17	AUDIO FILM CAPACITOR	CFTXA103J50
	C18	ELECTR. CAPACITOR	CEAS102M16
	C19	ELECTR. CAPACITOR	CENA221M25
	C2	CERAMIC CAPACITOR	CCCCH300J50
	C21	AUDIO FILM CAPACITOR	CFTXA333J50
	C22	ELECTR. CAPACITOR	CEASR47M50
	C23	ELECTR. CAPACITOR	CEAS101M50
	C25	ELECTR. CAPACITOR	CENA101M25
	C26	ELECTR. CAPACITOR	CEAS101M50
	C27	AUDIO FILM CAPACITOR	CFTXA472J50
	C28	ELECTR. CAPACITOR	CENA101M25
	C29	AUDIO FILM CAPACITOR	CFTXA272J50
	C3	CERAMIC CAPACITOR	CCCCH390J50
	C31,32	AUDIO FILM CAPACITOR	CFTXA104J50
	C33	AUDIO FILM CAPACITOR	CFTXA102J50
	C34	ELECTR. CAPACITOR	CEAS4R7M50
	C35	AUDIO FILM CAPACITOR	CFTXA104J50
	C36	ELECTR. CAPACITOR	CEAS101M50
	C37	AUDIO FILM CAPACITOR	CFTXA104J50
	C38	ELECTR. CAPACITOR	CENA101M25
	C39	CERAMIC CAPACITOR	CKCYF103Z50
	C4	CERAMIC CAPACITOR	CCCCH300J50
	C41	ELECTR. CAPACITOR	CENA101M25
	C42	AUDIO FILM CAPACITOR	CFTXA334J50
	C43	ELECTR. CAPACITOR	CEAS101M10
	C44	AUDIO FILM CAPACITOR	CFTXA153J50
	C45	AUDIO FILM CAPACITOR	CFTXA104J50
	C46	AUDIO FILM CAPACITOR	CFTXA103J50
	C47	ELECTR. CAPACITOR	CEAS101M50
	C48	ELECTR. CAPACITOR	CEAS3R3M50
	C49	AUDIO FILM CAPACITOR	CFTXA472J50
	C5	ELECTR. CAPACITOR	CENA471M16
	C50	ELECTR. CAPACITOR	CEAS330M16
	C51	AUDIO FILM CAPACITOR	CFTXA102J50

Mark	No.	Description	Parts No.
	C52	CERAMIC CAPACITOR	CKCYF473Z50
	C53	CERAMIC CAPACITOR	CCCCH300J50
	C54	ELECTR. CAPACITOR	CEAS101M50
	C55	CERAMIC CAPACITOR	CKCYF473Z50
	C60−66	CERAMIC CAPACITOR	CKCYF103Z50
	C67	ELECTR. CAPACITOR	CEANP100M25
	C69	ELECTR. CAPACITOR	CEASR33M50
	C7	ELECTR. CAPACITOR	CENA471M16
	C81	AUDIO FILM CAPACITOR	CFTXA681J50
	C85,86	CERAMIC CAPACITOR	CCCCH120J50
	C87	ELECTR. CAPACITOR	CEAS330M50
	C88,89	ELECTR. CAPACITOR	CEAS101M50
	C9	AUDIO FILM CAPACITOR	CFTXA333J50
	C90	ELECTR. CAPACITOR	CEAS101M50
	C99	CERAMIC CAPACITOR	CKCYF473Z50
RESISTORS			
	VR2	VR	VRTB6VS103
	VR3−7	VR	VRTB6VS223
	VR8	VR	VRTS6VS102
	R137,138	CARBON FILM RESISTOR	RDR1/2PM2R4J
	R14	CARBON FILM RESISTOR	RDR1/2PM240J
	R23		RD1/4PM153J
	R30	METAL OXIDE RESISTOR	RN1/6PQ3601F
	R47	CARBON FILM RESISTOR	RDR1/2PM103J
	R52	CARBON FILM RESISTOR	RDR1/2PM470J
	R53	CARBON FILM RESISTOR	RDR1/2PM103J
	Other resistors		RD1/6PM□□□J
OTHERS			
	CN1	CONNECTOR	5597−21APB
	CN6	JUMPER CONNECTOR 10−P	KPC10
	CN7	JUMPER CONNECTOR 9−P	KPC9
	DL1,2	DELAY LINE	PTE1012
	JA2	PIN JACK 1−P	PKB1004
	JA3		TOTX173
	X1	CERAMIC OSCILATOR (4.0MHZ)	FCR4.0MC
	X2	CRISTAL RESONATOR	PSS1001

Mark	No.	Description	Parts No.
◉ AUDIO BOARD ASSEMBLY (PWZ1769)			
SEMICONDUCTORS			
	IC500,501	D/A CONVERTER	PCM63P−K
	IC502,503	OP−AMP IC	NJM5532DD
⚠	IC504	REGULATOR IC	NJM7805FA
⚠	IC505	REGULATOR IC	NJM7905FA
	IC506,507	OP−AMP IC	NJM2068DD
	IC508,509	LOGIC IC	MC74HCU04N
	Q500,501	FET	2SK364
	Q502,503	FET	2SJ104
	Q512,513	TRANSISTOR	2SC3068
	Q514,515	FET	2SK364
	Q516,517	FET	2SJ104
	Q520,521	TRANSISTOR	2SC3068
	Q522	FET	DTC124ES
	D511−513	DIODE	1SS254
COILS			
	L501,502	FERRAITE BEAD	PTH1002
	L503,504		PTH1006
CAPACITOR			
	C500−503	ELECTR. CAPACITOR	CENA101M25
	C504,505	AUDIO FILM CAPACITOR	CFTXA104J50
	C506,507	ELECTR. CAPACITOR	CENA101M25
	C508,509	AUDIO FILM CAPACITOR	CFTXA104J50
	C510,511	ELECTR. CAPACITOR	CENA101M25
	C512,513	AUDIO FILM CAPACITOR	CFTXA104J50
	C514−519	ELECTR. CAPACITOR	CENA101M25
	C520,521	AUDIO FILM CAPACITOR	CFTXA104J50
	C522,523	STYRENE CAPACITOR	CQSF101J50
	C527	ELECTR. CAPACITOR	CENA100M50
	C530−533	ELECTR. CAPACITOR	CENA101M25
	C534−537	AUDIO FILM CAPACITOR	CFTXA103J50
	C546,547	STYRENE CAPACITOR	CQSF681J50
	C548,549	PP CAPACITOR	CQPYA752J2A
	C550,551	CAPACITOR(0.01)	PCL1023
	C552,553	STYRENE CAPACITOR	CQSF122J50
	C556−559	ELECTR. CAPACITOR	CENA101M25
	C560−563	AUDIO FILM CAPACITOR	CFTXA103J50
	C564,565	ELECTR. CAPACITOR	PCH1094
	C566,567	STYRENE CAPACITOR	CQSF102J50
	C568,569	CERAMIC CAPACITOR	CKCYF473Z50
	C576	AUDIO FILM CAPACITOR	CFTXA473J50
	C578,579	STYRENE CAPACITOR	CFTXA103J50
	C580,581	AUDIO FILM CAPACITOR	CFTXA103J50

Mark	No.	Description	Parts No.
	C582,583	CERAMIC CAPACITOR	CKDYF473Z50
	C584–587	ELECTR. CAPACITOR	CENA221M50
	C590,591	AUDIO FILM CAPACITOR	CFTXA103J50
	C592,593	ELECTR. CAPACITOR	CENA221M50
	C594,595	AUDIO FILM CAPACITOR	CFTXA103J50
	C596	CERAMIC CAPACITOR	CKCYF473Z50
RESISTORS			
	VR506–509	VR	PCP–041
	R500,501	CARBON FILM RESISTOR	RDR1/4PM102J
	R502,503	CARBON FILM RESISTOR	RDR1/4PM334J
	R504,505	CARBON FILM RESISTOR	RDR1/4PM102J
	R510,511	CARBON FILM RESISTOR	RDM1/2P472J
	R544,545	RESISTOR	RDM1/2P471J
	R560,561	CARBON FILM RESISTOR	RDR1/4PM361J
	R562,563	CARBON FILM RESISTOR	RD1/6PM361J
	R564	CARBON FILM RESISTOR	RDR1/4PM562J
	R574	CARBON FILM RESISTOR	RD1/6PM103J
	R575	CARBON FILM RESISTOR	RD1/6PM473J
		Other resistors	RDR1/2PM□□□J
OTHERS			
	CN503	JUMPER CONNECTOR 10–P	KPC10
	JA501	JACK 2–P	PKB1011

POWER SUPPLY BOARD ASSEMBLY

SEMICONDUCTORS

Mark	No.	Description	Parts No.
⚠	IC613	REGULATOR IC	NJM7812FA
⚠	IC614	REGULATOR IC	NJM7912FA
	IC615	OP AMP	NJM5532DD
⚠	IC620,621	IC PROTECTOR	ICP–N10
⚠	Q617	POWER TRANSISTOR	2SB857
	Q618	TRANSISTOR	2SD755
⚠	Q619	POWER TRANSISTOR	2SD1133
	Q620	TRANSISTOR	2SD755
	Q621	TRANSISTOR	2SB715
⚠	Q622	POWER TRANSISTOR	2SB857
	Q623	TRANSISTOR	2SB715
⚠	Q624	POWER TRANSISTOR	2SD1133
	Q625	TRANSISTOR	2SA933S
	Q626	TRANSISTOR	2SC1740S
⚠	D620–627	DIODE	10DF2
⚠	D628–631	ZENER DIODE	HZ5CLL

Mark	No.	Description	Parts No.
COILS			
	L601,602		PTH1006
CAPACITORS			
	C602,603	ELECTR. CAPACITOR	CENA470M50
	C604,605	ELECTR. CAPACITOR	CENA222M35
	C606,607	ELECTR. CAPACITOR	CENA102M35
	C608–611	CERAMIC CAPACITOR	CKCYF103Z50
	C612,613	ELECTR. CAPACITOR	CENA102M35
	C614–619	CERAMIC CAPACITOR	CKCYF103Z50
	C620,621	ELECTR. CAPACITOR	CENA470M50
	C624,625	AUDIO FILM CAPACITOR	CFTXA103J50
RESISTORS			
	R647,648	METAL OXIDE RESISTOR	RN1/4PQ3001F
	R649,650	METAL OXIDE RESISTOR	RN1/4PQ4301F
		Other resistors	RDR1/4PM□□□J

PRIMARY BOARD ASSEMBLY

COIL

Mark	No.	Description	Parts No.
⚠	L301	LINE FILTER	PTL1002

SWITCH

Mark	No.	Description	Parts No.
⚠	S301	POWER SW	PSA–009

CAPACITORS

Mark	No.	Description	Parts No.
⚠	C301–303	POWER CAPACITOR (0.01μF)	VCG–048

SERVO POWER SUPPLY BOARD ASSEMBLY

SEMICONDUCTORS

Mark	No.	Description	Parts No.
⚠	IC701	REGULATOR IC	NJM7808FA
⚠	IC702	REGULATOR IC	NJM7908FA

CAPACITORS

No.	Description	Parts No.
C701–704	ELECTR. CAPACITOR	CENA101M50

COILS

No.	Description	Parts No.
L701,702	BEAD	PTH1006

7. ADJUSTMENTS

The following adjustments have to be performed in the given order.

• Adjustment items

1. Adjusting the tracking error offset, focus offset, and RF offset.
2. Adjusting the RF level.
3. Checking the LD (laser diode) power.
4. Checking the focus lock and spindle lock.
5. Adjusting the grating.
6. Adjusting the tracking balance.
7. Adjusting the tangential screw.
8. Adjusting the radial screw.
9. Adjusting the focus gain.
10. Adjusting the tracking gain.
11. Adjusting the VCO free run frequency.
12. D/A converter

• Instruments required for adjustments

1. Dual channel oscilloscope
2. Optical power meter
3. Test disc (YEDS-7), 8-cm-disc
4. Loop gain adjustment filter
5. Signal generator
6. Frequency counter
7. Other standard tools

• Test mode

All adjustments have to be performed in the test mode.

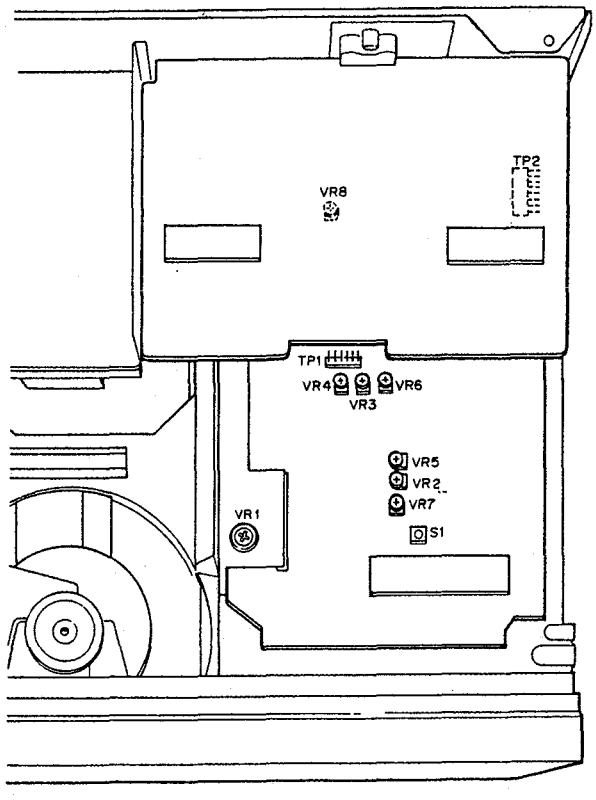
Procedures for setting and cancelling the test mode.

1. Turn on the power switch (S301) to set the test mode while holding down the test mode switch (S1).
2. Turn off the power switch to cancel the test mode.

In the test mode, the keys have the functions shown in table 7-1.

•Adjustment VRs (variable resistor) and their names

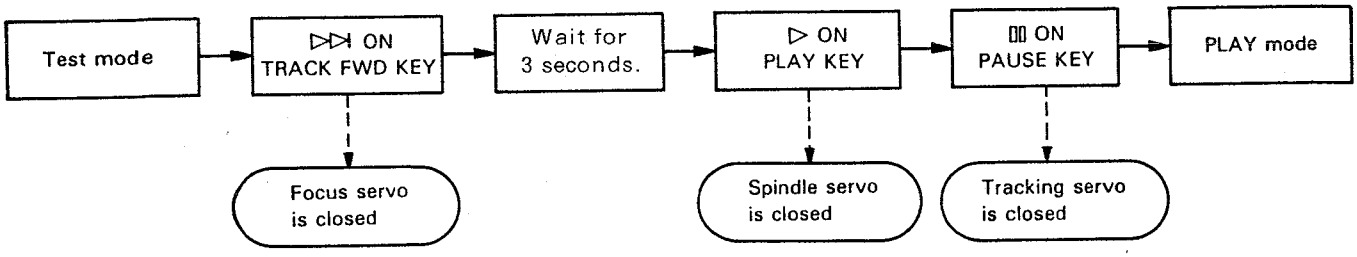
VR1: Laser power
VR2: RF offset (RF OFS)
VR3: Focus gain (FCS GAN)
VR4: Tracking gain (TRK GAN)
VR5: Tracking balance (TRK BAL)
VR6: Focus offset (FCS OFS)
VR7: Tracking offset (TRK OFS)
VR8: VCO adjustment (VCO ADJ)



Components to be adjusted

Each servo is closed or opened independently by an appropriate operation in the test mode. To set the normal play mode, each servo should be closed one by one in the serial sequence. You cannot enter the play mode by depressing the PAUSE key (⏸) in the test mode. The keys should be depressed in the following sequence to enter the play mode from the stop mode.

* Each servo should be operated in the serial sequence in the test mode.

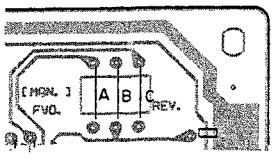


•Key Functions in Test Mode

Symbol	Key name	Function in the test mode	Remarks
⏭	TRACK FWD	Focus servo closed	To turn on the laser diode, move the focus actuator up and down, and close the focus servo.
▷	PLAY	Spindle servo closed	To close the servo in the CLV-A mode after activating the spindle motor.
⏸	PAUSE	Tracking servo closed/opened	To perform toggle operations. When it is depressed, the tracking servo is closed and the system switches to the play status. (The focus servo and spindle servo must be closed when it is depressed.) Then the PAUSE indicator is lit. Depress it again to open the tracking servo.
□	STOP	Stop	To stop all the servos and reset the system to the initial status.
⏏	OPEN/CLOSE	(Disc tray) Open/close	To open or close the disc tray. The pickup, however, will not return to the home position when the tray is open and will remain in the current status when it is closed.
	DISPLAY (MANUAL, OFF SEARCH FWD in the remote mode)	Carriage forward	To move the carriage rapidly (at the rate of about 1 cm/sec) toward the outer radius. Do not move it too far since there are no safety devices to stop the carriage.
	OUTPUT SEL (MANUAL SEARCH REV in the remote mode)	Carriage reverse	To move the carriage rapidly (at the rate of about 1 cm/sec) toward the inner radius. Do not move it too far since there are no safety devices to stop the carriage.

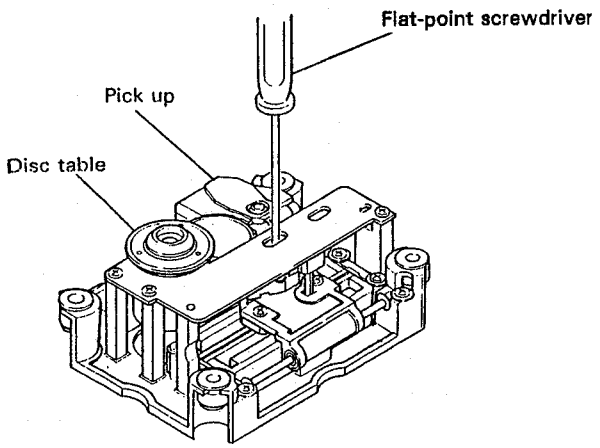
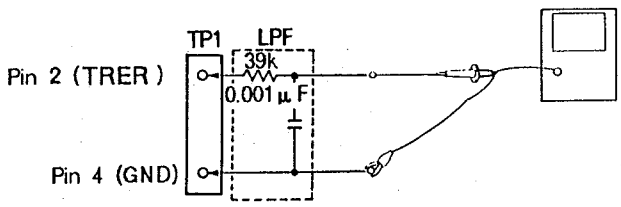
Table 7-1
The above keys can be used for remote control in the test mode.

•When performing a manual search



* Connect the JPs on the control circuit board to perform a MANUAL SEARCH. Layout of the control circuit board Connecting between JPs, C and B: MANUAL SEARCH REV Connecting between JPs, A and B: MANUAL SEARCH FWD

Procedure	Oscilloscope range V	Oscilloscope range H	Test point	Component for adjustment	Check item/adjustment specification	Adjustment procedure
1 Adjusting the tracking error offset, focus offset, and RF offset.						
					Tracking error offset	•Switch to the test mode (see page 34).
				VR5 (TRX BAL)	45°	• Rotate VR5, TRK BAL (tracking balance) about 45° leftward from the center.
			Pin 2 in TP1 (TRK ER)	VR7 (TRX OFS)	0V±50mV	• Adjust VR7, TRK OFS (tracking offset) so that the TRK ER (tracking error) voltage at pin 2 of TR1 becomes 0V±50mV.
			Pin 6 in TP1 (FCS ER)	VR6 (FCS OFS)	Focus offset 0V±50mV	• Adjust VR6, FCS OFS (focus offset) so that the FCS ER (focus error) voltage at pin 6 of TR1 becomes 0V±50mV.
			Pin 1 in TP1 (RF output)	VR2 (RF.OFS)	RF offset 100mV-±50mV	• Adjust VR2, RF OFS (RF offset) so that the output (RF output) voltage at pin 1 of TR1 becomes 100mV±50mV.
						Note: When adjusting the tracking error offset, "the tracking balance adjustment in procedure 6" must always be performed.
2 Adjusting the RF level						
						•Switch to the test mode (see page 34).
						•Measure the P-P voltage in the RF waveform by playing the test disc and connecting pin 1 of TP1 (RF output) to the oscilloscope.
			Pin 1 of TP1 (RF output)	VR1 (laser power)	1.5V $^{+0.2V}_{-0V}$	• Adjust VR1 so that the voltage becomes 1.5V $^{+0.2V}_{-0V}$.
3 Checking the LD (laser diode) power						
						•Switch to the test mode (see page 34).
						•Turn on the LD (laser diode) by depressing the TRACK FWD key (▷▷I).
				Check	0.13mV or less	•Check that the LD power is 0.13mV or less by placing the optical power meter right above the object lens.

Procedure	Oscilloscope range V	Oscilloscope range H	Test point	Component for adjustment	Check item/adjustment specification	Adjustment procedure
4	Adjusting the focus lock and spindle lock					
	V 0.5V/div	H 100msec/ div	Pin 1 in TP1 (RF output)		With the RF output Rotation in the positive (clockwise) direction	• Set the test disc. • Turn the test mode (see page 34). • Move the pickup near the center of the disc by using the MANUAL SEARCH FWD JPs. • While observing the RF output at pin 1 of TP1 on the oscilloscope, check that RF signals are output after the TRACK FWD key (▷▷I) has been depressed. • Depress the PLAY key (▷) and check that the disc rotates in the positive (clockwise) direction at a nearly constant rate (about 300rpm near the center) and does not rotate in the negative direction or run with irregular speed.
5	Adjusting the grating (1) (In the case of a 8-cm-disc)					
	 Figure 7-1					• Switch to the test mode (see page 34) • Move the pickup near the inner radius by using the MANUAL SEARCH FWD JPs so that the grating adjustment screw of the pickup can be seen from the hole on the spindle motor side, one of the elliptical holes which are located on the base plate of the servo mechanism. • Insert an appropriate slotted screwdriver (2mm precision screwdriver) from the upper side of the mechanism as shown in figure 7-1, and make sure that the grating adjustment screw can be turned. • Put the disc on it.
	 Figure 7-2					• Depress the TRACK FWD key (▷▷I) and then the PLAY key (▷) to close the focus servo and spindle servo (the tracking servo will not close). • Observe the TRER (tracking error) waveform at pin 2 of TP1 on the oscilloscope. To perform this, insert the lowpass filter with the cutoff frequency of 4kHz between pin 2 (TRER) and pin 4 (GND) of TP1 (figure 7-2).

Procedure	Oscilloscope range V	Oscilloscope range H	Test point	Component for adjustment	Check item/adjustment specification	Adjustment procedure
	0.5V/div	5msec/div	Pin 2 of TP1 (TRK ER)	Grating adjustment screw	Zero point	• Locate the zero point (see photo 7-1) by turning the slotted screwdriver.
				Grating adjustment screw	Maximum amplitude	• Then locate the first peak of the waveform (tracking error signals; see photo 7-3) by rotating the slotted screwdriver slowly from the zero point in the counter-clockwise direction. Note: If there is too much pressure on the slotted screwdriver, the pickup will lean in the tangential direction, making the adjustment difficult. • Finally remove the lowpass filter, and check that the P-P voltage of the tracking error signals does not vary with a large amplitude when the pickup is moved near the inner disc radius and to the outer disc radius. If the level shifts by ±10% or more, turn the grating adjustment screw again to locate the position where the error amplitude becomes maximum.

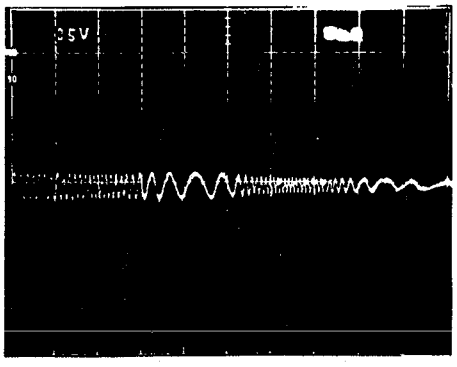


Photo 7-1 Zero point

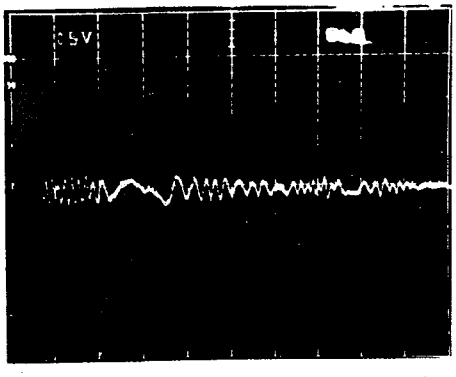


Photo 7-2 Waveform off from the zero point

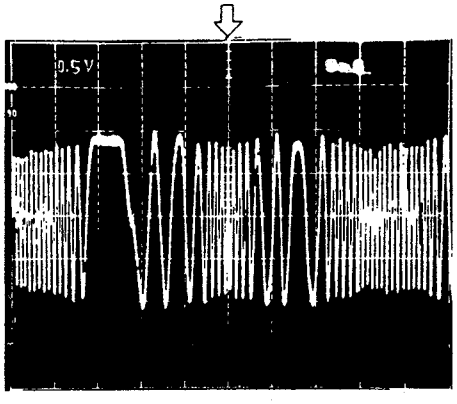
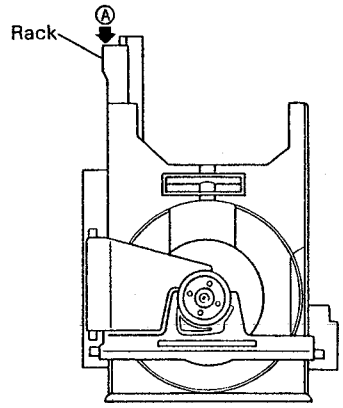
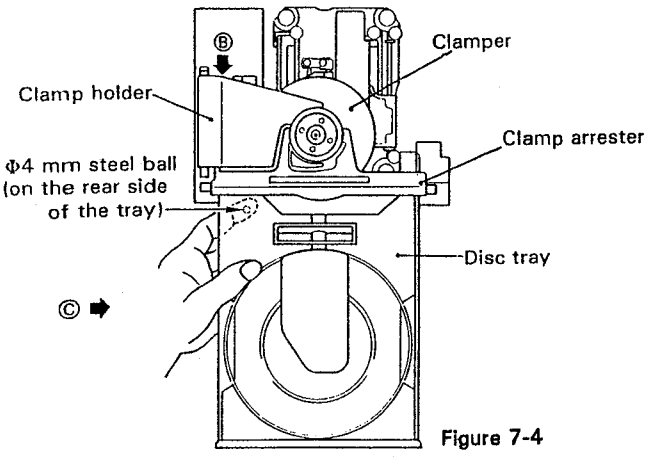
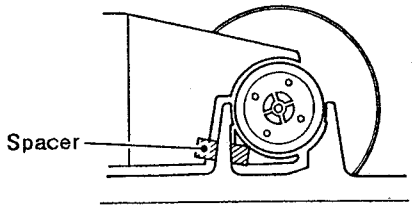
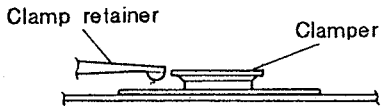


Photo 7-3 Maximum amplitude

Pro-cedure	Oscilloscope range V	Oscilloscope range H	Test point	Component for adjustment	Check item/adjustment specification	Adjustment procedure
5	Adjusting the grating (2) (in the case of a disc with 60 minutes recording time or more)					
	 Figure 7-3					The following adjustments must be performed after the disc tray has been removed. • Removing the disc tray 1. While pressing the back end Ⓐ on the rack in figure 7-3, pull the disk tray (*1) until it stops (this stop position is shown in figure 7-4). (*1) Pressing the back end Ⓐ of the rack first unlocks the clamp of the disc. By holding it pressed after unlocking, the disc tray can be pulled.
	 Figure 7-4					2. While lifting part Ⓑ of the clamp holder in figure 7-4 with your right hand, hold and pull part Ⓒ of the tray with your left hand. Care is required not to drop the φ4 steel ball (hold the ball with your index finger).
	 Figure 7-5					
	 Figure 7-6					

Procedure	Oscilloscope range V	Oscilloscope range H	Test point	Component for adjustment	Check item/adjustment specification	Adjustment procedure
						This adjustment is only possible on those discs that have pits up to 115mm in a radial direction; it cannot be performed with the test disc (YEDS-7). • Switch to the test mode (see page 34) • Set the test disc. Move the pickup to the outermost radius so that the pickup is on the pit surface of the disc, and the grating adjustment screw of the pickup can be seen through the hole on the servo mechanism (see figure 7-7). • Depress the TRACK FWD key (▷▷|) and then the PLAY key (▷) to close the focus servo and spindle servo (the tracking servo will not close). • Insert the 4kHz lowpass filter and observe the TRK ER (tracking error) waveform at pin 2 of TP1 on an appropriate oscilloscope (see figure 7-8).
	0.5V/div	5msec/div	Pin 2 of TP1	Grating Grating	Zero point Maximum amplitude	• Locate the zero point (photo 7-1) by turning the slotted screwdriver. • Then locate the first peak of the waveform (tracking error signals; see photo 7-3) by rotating the screwdriver slowly from the zero point in the counter-clockwise direction. Note: If there is too much pressure on the slotted screwdriver, the pickup will lean in the tangential direction, making the adjustment difficult. • Finally remove the lowpass filter, and check that the P-P voltage of tracking error signals does not indicate a large amplitude when the pickup is moved near the inner disc radius and to the outer disc radius. If the level shifts by ±10% or more, turn the grating adjustment screw again to locate the position where the error amplitude becomes maximum.

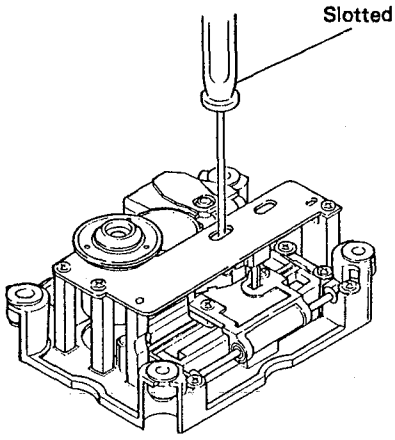


Figure 7-7

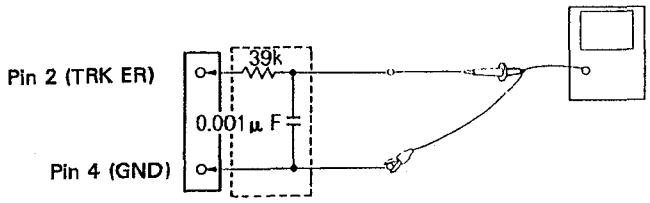


Figure 7-8

Procedure	Oscilloscope range V	Oscilloscope range H	Test point	Component for adjustment	Check item/adjustment specification	Adjustment procedure
6	Adjusting the tracking balance					
	0.5V/div	5msec/div	Pin 2 of TP1 (TRK ER)	VR5 (TRK BAL)		• Set the test disc. • Switch to the test mode (see page 34). • Move the pickup near the center of the disc by using MANUAL SEARCH FWD JPs. • Depress the TRACK FWD key (▷▷I) and the PLAY key (▷) to rotate the disc. • While observing the TRK ER (tracking error) at pin 2 of TP1 on the oscilloscope, adjust VR5, TRK BAL (tracking balance) so that the DC component in the tracking error becomes zero.

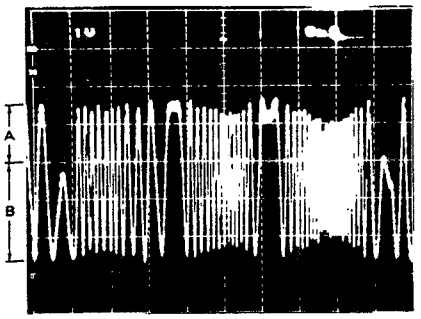


Photo 7-4 With DC component

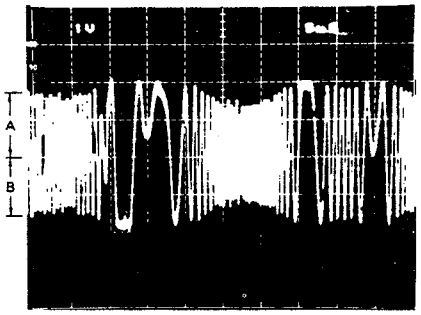
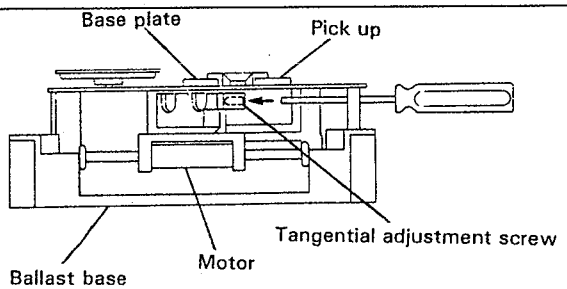


Photo 7-5 Without DC component

7 Adjusting the tangential screw (which must be done with the mechanism removed or with the audio board assembly on the rear removed)



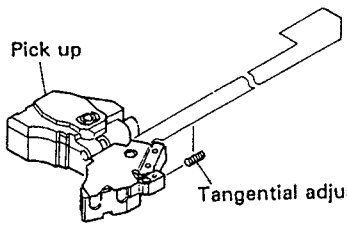
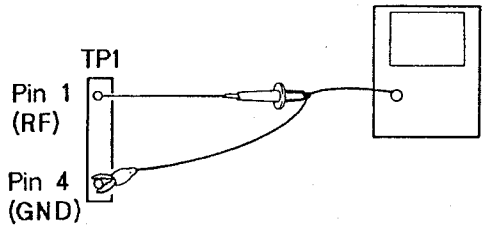


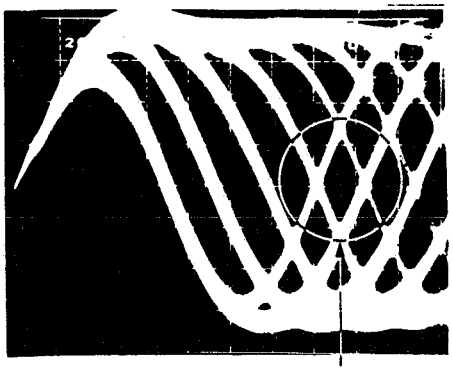
Figure 7-9

•Turn the test mode (see page 34).
• Open the tray and set the disc.
• Move the pickup near the center of the disc by using the MANUAL SEARCH FWD JPs.
• Put an appropriate hexagon head screw driver on the tangential adjustment screw from the rear side of the mechanism.
• Close the tray.

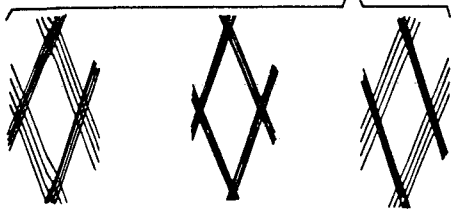
Note: Do not use an L shape type hexagon head screwdriver. Use a straight one as shown in figure 7-9. If only an L shape type screw driver is available, the tray must be removed (refer to item 1 for the grating adjustment in procedure 5 on page 37).

• Close all the servos by depressing the TRACK FWD key (▷▷I), the PLAY key (▷), and the PAUSE key (II) in this order (the pause indicator is lit).

Procedure	Oscilloscope range V	Oscilloscope range H	Test point	Component for adjustment	Check item/adjustment specification	Adjustment procedure
		200nsec/div	Pin 1 of TP1 (RF output)	Tangential adjustment screw	Best I-pattern setting	• Close the focus, spindle and tracking servos by depressing the TRACK FWD key (▷▷I), the PLAY key (▷), and the PAUSE key (▯▯) in this order. • While observing the RF output at pin 1 of TP1 on the oscilloscope, adjust the tangential adjustment screw so that the I-pattern looks fine. • Put the tangential adjustment screw at the midpoint between the two settings where the I-pattern starts to become distorted while turning this screw in the clockwise or counter-clockwise direction. The best I-pattern may be obtained when the I-pattern looks fine and the diamonds in the I-pattern are formed with the thinnest lines possible (see Photo 7-8).  Figure 7-10 Note: While adjusting, lift the hexagon head screwdriver a bit so that the pickup will not move down.



Diamond to be observed



Off from the best setting

Best setting

Off from the best setting

Photo 7–6

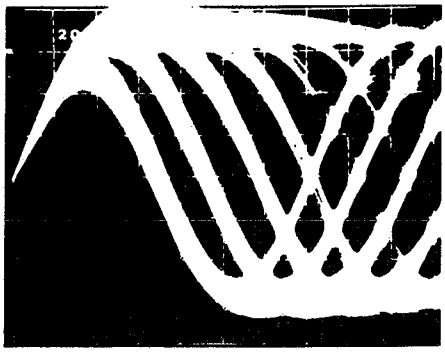


Photo 7–7

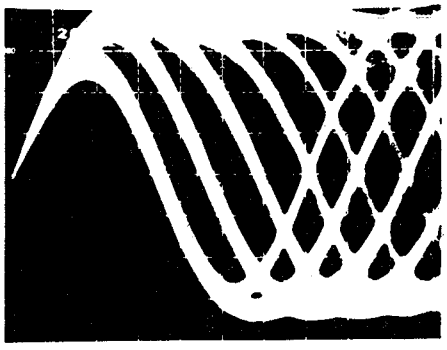


Photo 7–8

Photo 7–9

Procedure	Oscilloscope range V	Oscilloscope range H	Test point	Component for adjustment	Check item/adjustment specification	Adjustment procedure
8	Radial adjustment					
			Pin 1 of TP1 (RF output)	Adjusting the radial adjustment screw	Best I-pattern setting	• This adjustment must be performed after the disc tray has been removed. Note: Refer to "5. Adjusting the grating (2)" on page 39 for removing the tray. • Set the test disc. • Switch to the test mode (see page 34). • Move the pickup near the center so that the tangential adjustment screw can be seen from the top surface by using the MANUAL SEARCH FWD JPs (see figure 7-5). • Close all the servos by depressing the TRACK FWD key (▷▷I), the PLAY key (▷), and the PAUSE key (▯▯) in this order (the pause indicator is lit). • While observing the RF output at pin 1 of TP1 on the oscilloscope, adjust the radial adjustment screw so that the I-pattern looks fine (figure 7-11). •Put the radial adjustment screw at the midpoint between the two settings where the I-pattern starts to become distorted while turning this screw in the clockwise or counter-clockwise direction. The best I-pattern may be obtained when the I-pattern looks fine and the diamonds in the I-pattern are formed with the thinnest lines possible (see figure 7-8). • Repeat the tangential and radial adjustments alternately at least twice.

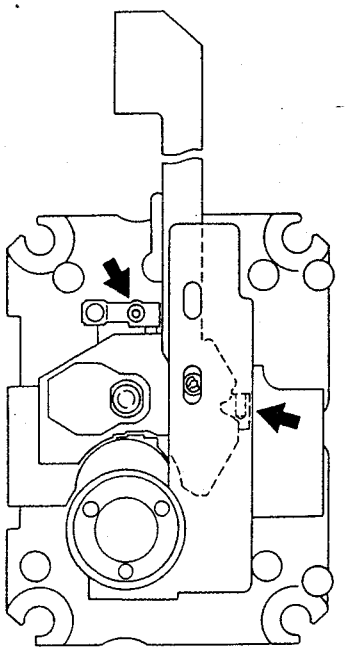


Figure 7-11

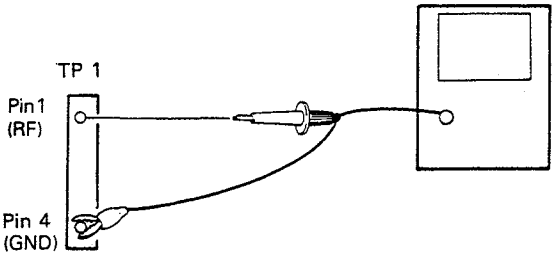


Figure 7-12

Pro-cedure	Oscilloscope range V	Oscilloscope range H	Test point	Component for adjustment	Check item/adjustment specification	Adjustment procedure
						• Mount the disc tray according to the following procedure after the adjustments. 1. Remove the disc and then the spacer. 2. While lifting part Ⓑ of the clamp holder in figure 7-4 with your right hand, hold part Ⓒ of the tray with your left hand (hold the ϕ4 steel ball with your index finger of the left hand in order not to drop the ball), insert the tray while putting the slide base into the plastic part on the loading base as shown in figure 7-13. (Care is required not to damage the front panel which may be occured when the front side of the front panel touches the burring on the slide base in the ϕ4 steel ball section.) 3. Insert the slide base into the two plastic parts at the back of the loading base (figure 7-14). 4. Push the tray all the way down.

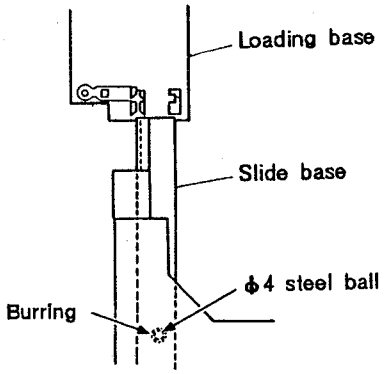


Figure 7-13

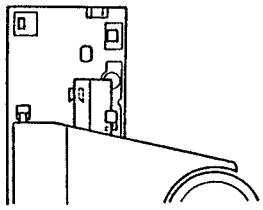


Figure 7-14

Procedure	Oscilloscope range V	Oscilloscope range H	Test point	Component for adjustment	Check item/adjustment specification	Adjustment procedure
9	Adjusting the focus gain					
	CH1(X), CH2(Y), 20mv/div, 5mv/div (probe 10:1)		X-axis Pin 5 of TP1 (FCS IN) Y-axis Pin 6 of TP1 (FCS ER)	VR3 (FCS GAN)	Phase difference 90°	• Connect the oscillator to the oscilloscope as shown in figure 7-15 while the power is off. • Set the unit to the normal PLAY mode. • Turn on the power on the oscilloscope and output 1.2kHz 1Vp-p. Note: Some oscillators output a DC signal when the power is turned on. In this case, connect the oscillator after its power has been turned on. • Adjust VR3, FCS GAN (focus gain) so that the Lissajous circle on the oscilloscope becomes a horizontal circle (with 90° for the phase difference).

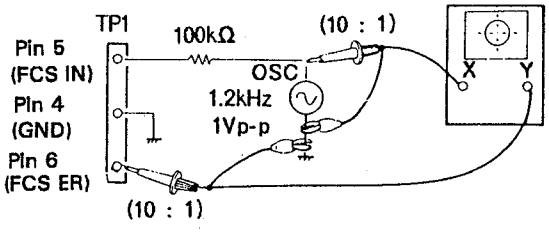
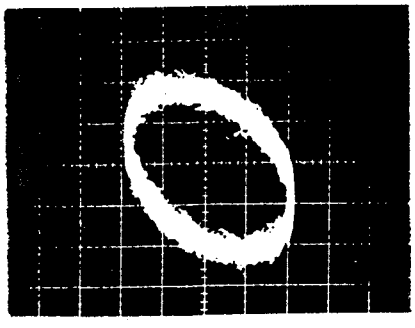
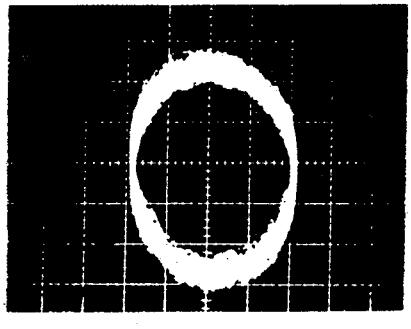


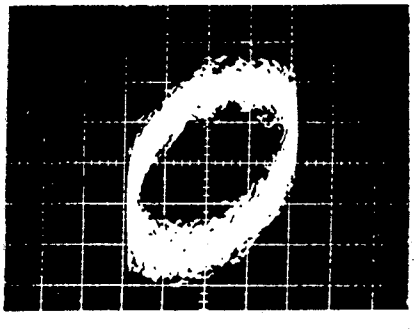
Figure 7-15



Large gain
Photo 7-10



Optimal gain
Photo 7-11



Small gain
Photo 7-12

Procedure	Oscilloscope range V	Oscilloscope range H	Test point	Component for adjustment	Check item/adjustment specification	Adjustment procedure
10	Adjusting the tracking gain					
	CH1(X), CH2(Y), 50mv/div, 5mv/div (probe 10:1)		X-axis Pin 3 of TP1 (TRK IN) Y-axis Pin 2 of TP1 (TRK ER)	VR4 (TRR GAN)	Phase difference 90°	• Connect the oscillator to the oscilloscope as shown in figure 7-16 while the power is off. • Set the unit to the normal PLAY mode. • Turn on the power on the oscilloscope and output 1.2kHz 2Vp-p. *Note: Some oscillators output a DC signal when the power is turned on. In this case, connect the oscillator after its power has been turned on.* • Adjust VR4, TRK GAN (focus gain) so that the Lissajous circle on the oscilloscope becomes a horizontal circle (with 90° for the phase difference).

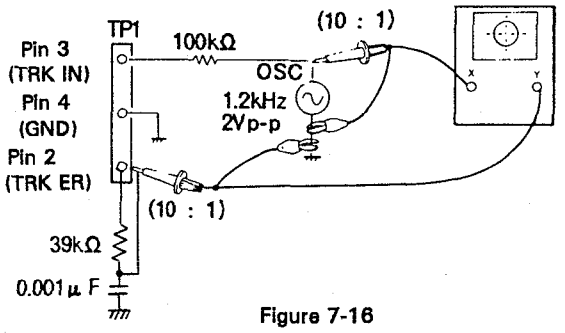
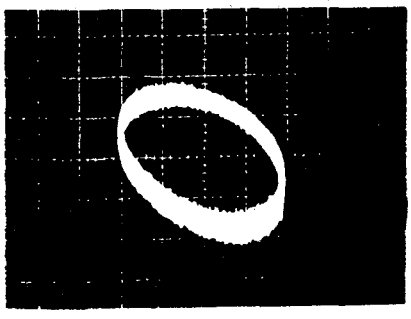
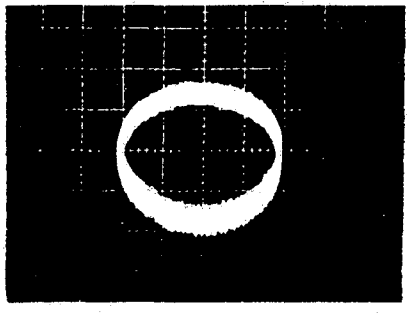


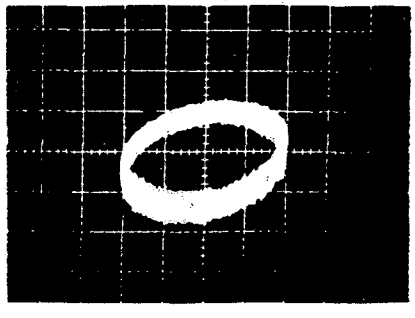
Figure 7-16



Large gain
Photo 7-13



Optimal gain
Photo 7-14



Small gain
Photo 7-15

Pro-cedure	Oscilloscope range V	Oscilloscope range H	Test point	Component for adjustment	Check item/adjustment specification	Adjustment procedure
11	Adjusting the VCO free run					
			Pin 2 of TP2	VR8 (VCO.ADJ)	4.275±0.025 MHz	• Switch to the test mode (see page 34). • Shunt the ASY and GND jumpers by using a slotted screwdriver or similar (see figure 7-17). • Connect pin 2 of TP2 to a relevant frequency counter that can be used at 10MHz or higher. • Adjust VR8, VCO ADJ (VCO free run adjustment) so that the frequency counter indicates 4.275±0.025MHz.
12	**Checking the S shape (focus error)**					
			Pin 6 of TP1 (FCS ER)			• Switch to the test mode (see page 34). • Shunt pin 5 (FCS IN: focus in) of TP1 to GND. • Depress the TRACK FWD key (▷▷I) and observe the waveform at pin 6 (FCS ER: focus in) of TP1.

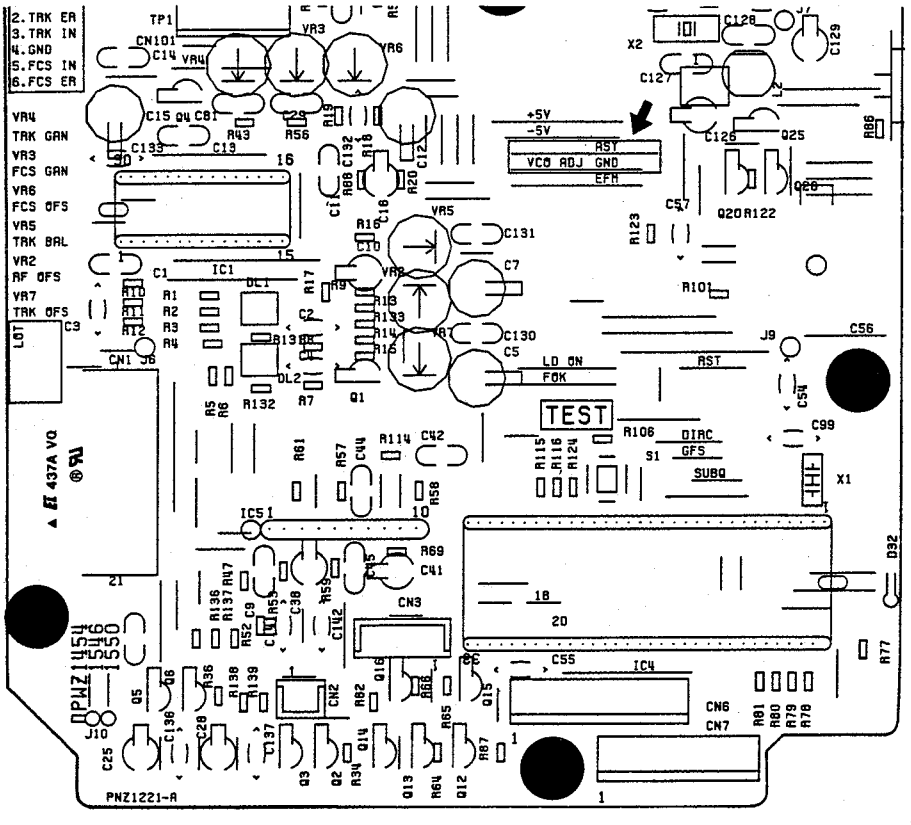


Figure 7-17

Procedure	Oscilloscope range V	Oscilloscope range H	Test point	Component for adjustment	Check item/adjustment specification	Adjustment procedure
13	Adjusting the D/A converter (BIT2)					
						• Remove the six registers (R500-R505) in the audio board assembly shown in figure 8.

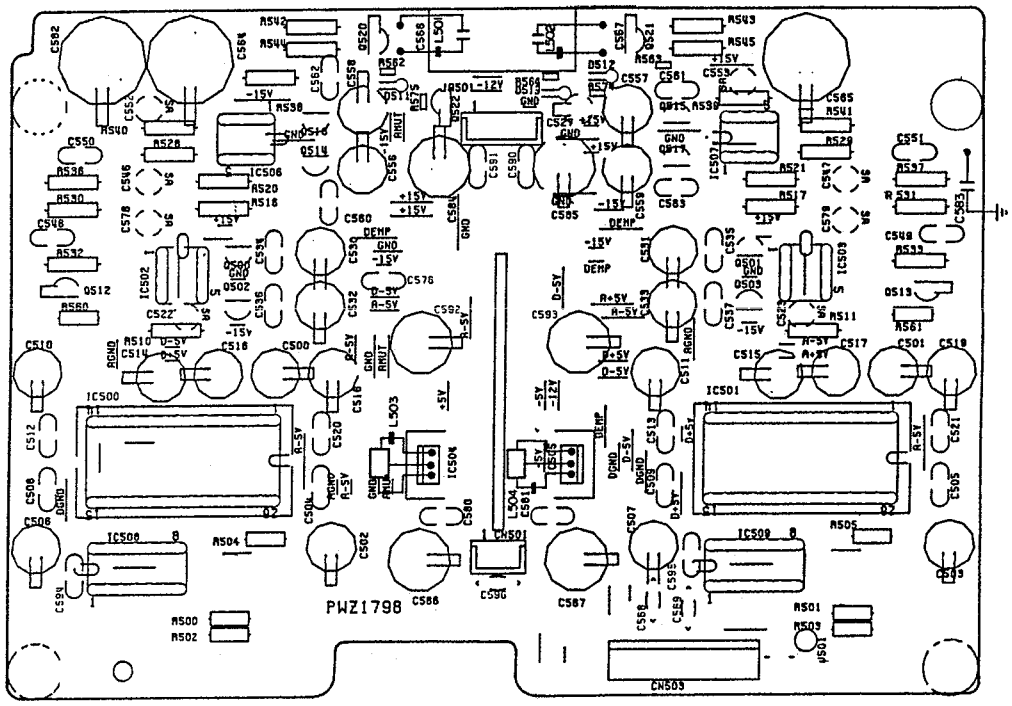


Figure 8

7. RÉGLAGE

Les réglages suivants doivent être exécutés dans l'ordre donné.

• Articles de réglage

1 Réglage du décalage d'erreur d'alignement, du décalage de mise au point et du décalage RF
2 Réglage du niveau RF
3 Vérification de l'alimentation LD (diode laser)
4 Vérification du verrouillage de mise au point et du verrouillage d'axe
5 Réglage de la grille
6 Réglage de l'équilibre d'alignement
7 Réglage de la vis tangentielle
8 Réglage de la vis radiale
9 Réglage du gain de mise au point
10 Réglage du gain d'alignement
11 Réglage de la fréquence libre VCO
12 Convertisseur D/A

• Equipements nécessaires aux réglages

1 Oscilloscope à double tracé
2 Wattmètre optique
3 Disque d'essai (YEDS-7), disque de 8 cm
4 Filtre de réglage de gain de boucle
5 Générateur de signal
6 Fréquencemètre
7 Autres outils standard

• Mode d'essai

Tous les réglages doivent être effectués, l'appareil se trouvant en mode d'essai.

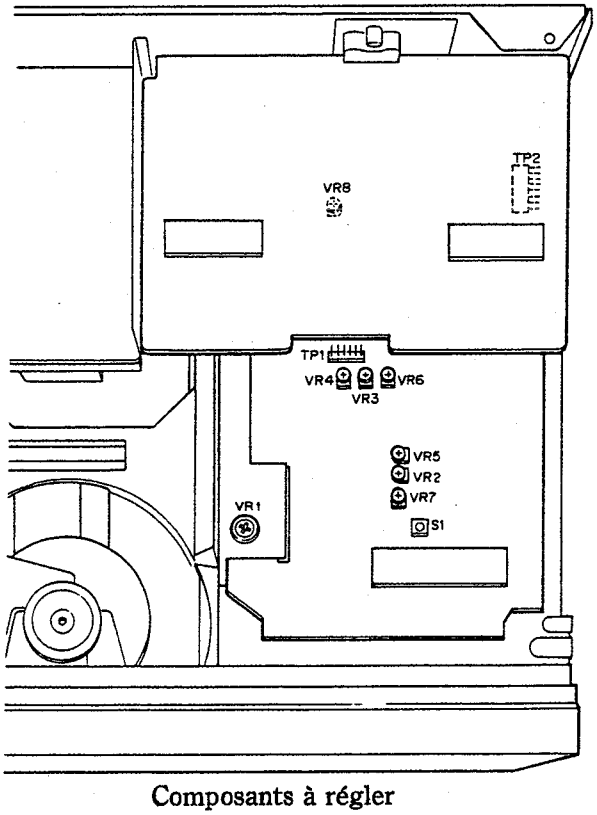
Procédures d'activation et d'annulation du mode d'essai.

1 Enclencher (ON) l'interrupteur d'alimentation (S301) pour activer le mode d'essai, après avoir placé l'interrupteur de mode d'essai (S1) à la position "ON".
2. Le mode d'essai est annulé en ramenant l'interrupteur d'alimentation sur la position "OFF".

Les fonctions des touches du mode d'essai sont décrites au Tableau 7-1.

• VR (résistances variables) de réglage et nomenclature

VR1 : Alimentation laser
VR2 : Décalage RF (RF OFS)
VR3 : Gain de mise au point (FCS GAN)
VR4 : Gain d'alignement (TRK GAN)
VR5 : Equilibrage d'alignement (TRK BAL)
VR6 : Décalage de mise au point (FCS OFS)
VR7 : Décalage d'alignement (TRK OFS)
VR8 : Réglage VCO (VCO ADJ)

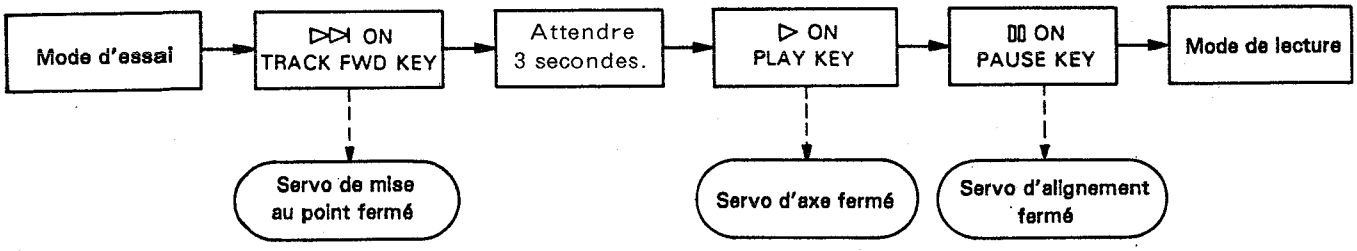


Composants à régler

En mode d'essai, les servos doivent être individuellement fermés et ouverts par une opération appropriée. En conséquence, les servos doivent chacun être fermés un par un en séquence sérielle pour passer au mode de lecture. En mode d'essai, vous ne pouvez pas passer au mode de lecture par une pression sur la seule touche PAUSE (⏸).

Les touches doivent être actionnées dans l'ordre suivant pour passer du mode d'arrêt au mode de lecture.

* En mode d'essai, les servos doivent être opérés en séquence sérielle.

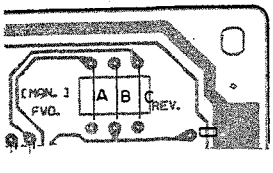


● FONCTIONS DES TOUCHES EN MODE D'ESSAI

Symbole	Nom de touche	Fonction en mode d'essai	Remarques
⏭	TRACK FWD	Servo de mise au point fermé	Pour allumer la diode laser, relever et abaisser le dispositif de commande de mise au point et fermer le servo de mise au point.
▷	PLAY	Servo d'axe fermé	Pour fermer le servo en mode CLV-A après lancement du moteur d'axe.
⏸	PAUSE	Servo d'alignement fermé/ouvert	Pour effectuer des opérations de bascule. Lorsqu'il est enfoncé, le servo d'alignement est fermé et le système passe au mode de lecture. (Les servos de mise au point et d'axe doivent être fermés lorsqu'il est enfoncé). Le témoin PAUSE est alors allumé. L'enfoncer de nouveau pour ouvrir le servo d'alignement.
□	STOP	Arrêt	Pour arrêter tous les servos et ramener le système à son état initial.
⏏	OPEN/CLOSE	Ouverture/fermeture de plateau de disque	Pour ouvrir ou fermer le plateau de disque. Cependant, le capteur ne revient pas à la position de repos lorsque le plateau est ouvert (OPEN) et il reste stationnaire lorsqu'il est fermé (CLOSE).
	Affichage (MANUAL, OFF SEARCH FWD en mode télécommande)	Avance du chariot	Pour déplacer rapidement le chariot (à une vitesse d'environ 1 cm/sec) vers la plage extérieure. Prendre garde à ne pas le déplacer trop loin, car il n'existe pas de dispositif de sécurité pour arrêter le chariot.
	Sélection de sortie (MANUAL SEARCH REV en mode télécommande)	Inversion du chariot	Pour déplacer rapidement le chariot (à une vitesse d'environ 1 cm/sec) vers la plage intérieure. Prendre garde à ne pas déplacer trop loin, car il n'existe pas de dispositif de sécurité pour arrêter le chariot.

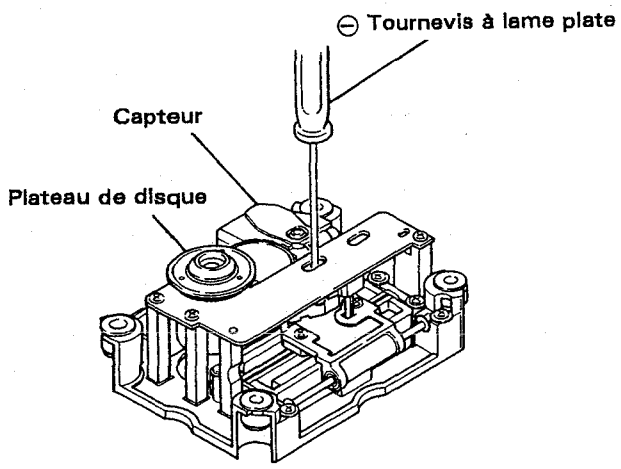
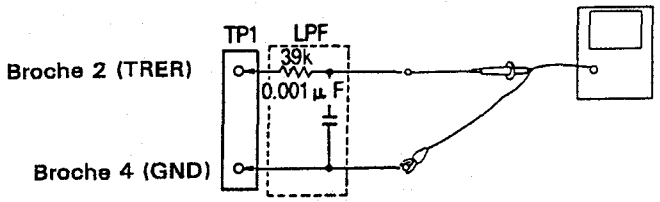
Tableau 7-1 Les touches ci-dessus peuvent être utilisées pour la télécommande en mode d'essai.

* En cas d'exécution d'une recherche manuelle



Connecter les JP de la plaque de circuit de commande pour effectuer une recherche manuelle. Disposition de la plaque de circuit de commande Connexion entre les JP C et B : recherche manuelle en arrière Connexion entre les JP A et B : recherche manuelle en avant

Procédure	Réglage d'oscilloscope V	Réglage d'oscilloscope H	Point d'essai	Composant de réglage	Poste de contrôle/ Spécification de réglage	Procédure de réglage
1	Réglage du décalage d'erreur d'alignement, du décalage de mise au point et du décalage RF.					
					Décalage d'erreur d'alignement	• Passer au mode d'essai (voir page 50).
				VR5 (TRK BAL)	45°	• Tourner VR5, TRK BAL (équilibrage d'alignement) d'environ 45° à la gauche du centre.
			Broche 2 dans TP1 (TRK ER)	VR7 (TRK OFS)	0 V ±50 mV	• Ajuster VR7, TRK OFS (décalage d'alignement) de sorte que la tension TRK ER (erreur d'alignement) à la broche 2 de TP1 devienne 0 V ±50 mV.
			Broche 6 dans TP1 (FCS ER)	VR6 (FCS OFS)	Décalage de mise au point 0 V ±50 mV	• Ajuster VR6, FCS OFS (décalage de mise au point) de sorte que la tension FCS ER (erreur de mise au point) à la broche 6 de TP1 devienne 0 V ±50 mV.
			Broche 1 dans TP1 (Sortie RF)	VR2 (RF. OFS)	Décalage RF 100 mV ±50 mV	• Ajuster VR2, RF OFS (décalage RF) de sorte que la tension de sortie (sortie RF) à la broche 1 de TP1 devienne 100 mV ±50 mV. Remarque : Lors du réglage du décalage d'erreur d'alignement, effectuer toujours "6. "Réglage d'équilibrage d'alignement".
2	Vérification du niveau RF					
			Broche 1 de TP1 (Sortie RF)	VR1 (Alimentation laser)	1.5 V $^{+0.2V}_{-0V}$	• Passer au mode d'essai (voir page 50). • Mesurer la tension c-c de la forme d'onde RF en reproduisant le disque d'essai et en raccordant la broche 1 de TP1 (sortie RF) à l'oscilloscope. • Régler VR1 pour que la tension soit de 1,5 V $^{+0,2\ V}_{-0\ V}$.
3	Vérification de l'alimentation LD (diode laser)					
				Vérifier	Egale ou inférieure à 0,13 mV	• Passer au mode d'essai (voir page 50). • Appuyer sur la touche TRACK FWD (▷▷I) pour allumer la diode laser. • Placer le wattmètre optique directement au-dessus de l'objectif et confirmer que l'alimentation LD est égale ou inférieure à 0,13 mV.

Procédure	Réglage d'oscilloscope V	Réglage d'oscilloscope H	Point d'essai	Composant de réglage	Poste de contrôle/ Spécification de réglage	Procédure de réglage
4	Réglage du verrouillage de mise au point et du verrouillage d'axe					
	V 0.5V/div	H 100msec/div	Broche 1 de TP1 (Sortie RF)		Avec la sortie RF Rotation positive (sens des aiguilles)	• Installer le disque d'essai. • Passer au mode d'essai (voir page 50). • Déplacer le capteur près du centre du disque en utilisant les JP MANUAL SEARCH FWD. • Tout en observant la sortie RF à la broche 1 de TP1 sur l'oscilloscope, vérifier que les signaux haute fréquence sont fournis après une pression sur la touche TRACK FWD (▷▷|). • Appuyer sur la touche PLAY (▷) et vérifier que le disque tourne à vitesse constante (env. 300 tr/mn près du centre du disque) dans le sens positif (sens des aiguilles) et ne tourne pas dans le sens contraire des aiguilles ou tourne de manière irrégulière.
5	Réglage de la grille (1) (dans le cas d'un disque de 8 cm)					
	 Figure 7-1  Figure 7-2					• Passer au mode d'essai (voir page 50). • Déplacer le capteur près de la plage intérieure en utilisant la touche JP MANUAL SEARCH FWD de sorte que sa vis de réglage de grille soit visible par l'orifice du côté du moteur d'axe, un des orifices elliptiques qui se trouvent sur la plaque de base du servo-mécanisme. • Introduire un tournevis ⊖ approprié (tournevis de précision de 2 mm) par le côté supérieur du mécanisme de la manière indiquée dans la figure 7-1 et vérifier que la vis de réglage de grille peut être tournée. • Mettre le disque d'essai dessus. • Appuyer sur les touches TRACK FWD (▷▷|) et PLAY (▷) pour fermer les servos de mise au point et d'axe (ne pas fermer le servo d'alignement). • Observer la forme d'onde TRER (erreur d'alignement) à la broche 2 de TP1 sur l'oscilloscope. Dans ce but, insérer le filtre passe-bas ayant la fréquence de coupure de 4 kHz entre la broche 2 (TRER) et la broche 4 (GND) de TP1 (figure 7-2).

Procédure	Réglage d'oscilloscope		Point d'essai	Composant de réglage	Poste de contrôle/ Spécification de réglage	Procédure de réglage
	V	H				
	0.5V/div	5msec/div	Broche 2 de TP1 (TRER)	Vis de réglage de grille Vis de réglage de grille	Point nul Amplitude maximale	• Tourner le tournevis ⊖ pour trouver le point nul (voir photo 7-1). • Localiser ensuite la première crête de la forme d'onde (signaux d'erreur d'alignement ; voir photo 7-3) en faisant lentement tourner le tournevis ⊖ à partir du point nul dans le sens inverse des aiguilles d'une montre. Remarque : Eviter d'appliquer trop de pression au tournevis pour ne pas incliner tangentiellement le capteur, rendant le réglage plus difficile. • En dernier lieu, retirer le filtre passe-bas et vérifier que la tension c-c des signaux d'erreur d'alignement ne varie par trop lorsque le capteur est déplacé près des première et dernière plages du disque. Si le niveau diverge de ±10% ou davantage, agir de nouveau sur la vis de réglage de grille pour localiser le point où l'amplitude d'erreur devient maximale.

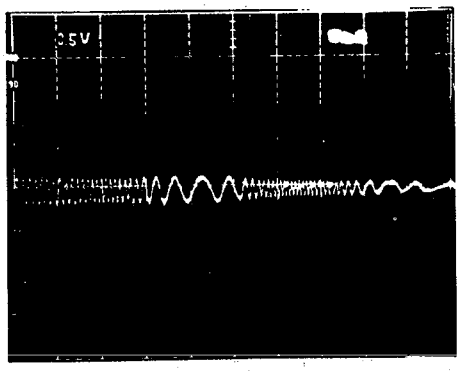


Photo 7-1 Point nul

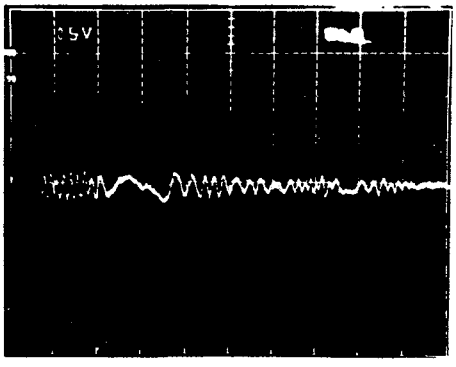
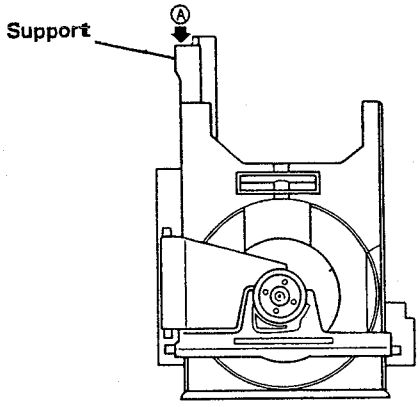
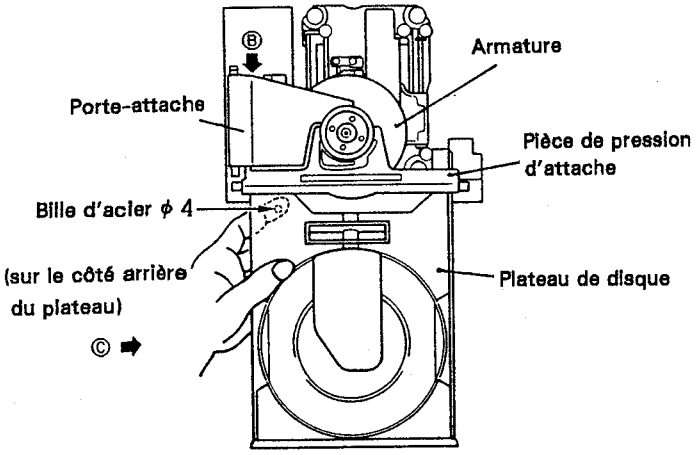
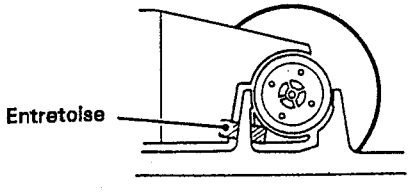
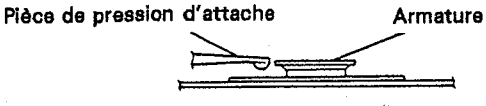


Photo 7-2 Forme d'onde à partir du point nul

Photo 7-3 Amplitude maximale

Procédure	Réglage d'oscilloscope V	Réglage d'oscilloscope H	Point d'essai	Composant de réglage	Poste de contrôle/ Spécification de réglage	Procédure de réglage
5	Réglage de la grille (2) (dans le cas d'un disque de 60 minutes de durée d'enregistrement ou plus)					
	 Figure 7-3					Les réglages suivants doivent être effectués après avoir retiré le plateau de disque. • Retrait du plateau de disque 1. Tout en appuyant sur le bord arrière Ⓐ du support dans la figure 7-3, retirer le plateau de disque (*1) jusqu'à ce qu'il s'arrête (cette position d'arrêt est indiquée dans la figure 7-4). (*1) Une pression sur le bord arrière Ⓐ du support permet de relâcher en premier l'attache du disque. Pour tirer le plateau de disque, continuer à appuyer après le relâchement.
	 Figure 7-4					2. Tout en relevant de la main droite la partie Ⓑ du porte-attache dans la figure 7-4, tenir le plateau et tirer la partie Ⓒ de la main gauche. Prendre garde à ne pas laisser tomber la bille d'acier ϕ 4 (maintenir la bille avec l'index gauche).
	 Figure 7-5					
	 Figure 7-6					

Pro-cédu-re	Réglage d'oscilloscope V	Réglage d'oscilloscope H	Point d'essai	Composant de réglage	Poste de contrôle/ Spécification de réglage	Procédure de réglage
						Ce réglage ne peut être effectué qu'avec un disque ayant des cavités jusqu'à 115 mm dans la direction axiale et non pas avec le disque d'essai (YEDS-7). • Passer au mode d'essai (voir page 50). • Installer le disque d'essai. Amener le capteur à la périphérie extérieure de sorte que le capteur se trouve sur la surface de la cavité du disque et que la vis de réglage de grille du capteur soit visible par l'orifice du servo-mécanisme (voir figure 7-7). • Appuyer sur les touches TRACK FWD (▷▷|) et PLAY (▷) pour fermer les servos de mise au point et d'axe (ne pas fermer le servo d'alignement). • Insérer le filtre passe-bas de 4 kHz et observer la forme d'onde TRK ER (erreur d'alignement) à la broche 2 de TP1 sur un oscilloscope approprié (voir figure 7-8).
	0. 5V/div	5msec/div	Broche 2 de TP1	Grille	Point nul	• Tourner le tournevis ⊖ pour trouver le point nul (voir photo 7-1). • Localiser ensuite la première crête de la forme d'onde (signaux d'erreur d'alignement ; voir photo 7-3) en faisant lentement tourner le tournevis ⊖ à partir du point nul dans le sens inverse des aiguilles d'une montre. Remarque: Eviter d'appliquer trop de pression au tournevis pour ne pas incliner tangentiellement le capteur, rendant le réglage plus difficile. • En dernier lieu, retirer le filtre passe-bas et vérifier que la tension c-c des signaux d'erreur d'alignement ne varie par trop lorsque le capteur est déplacé près des première et dernière plages du disque. Si le niveau diverge de ±10% ou davantage, agir de nouveau sur la vis de réglage de grille pour localiser le point où l'amplitude d'erreur devient maximale.
				Grille	Amplitude maximale	

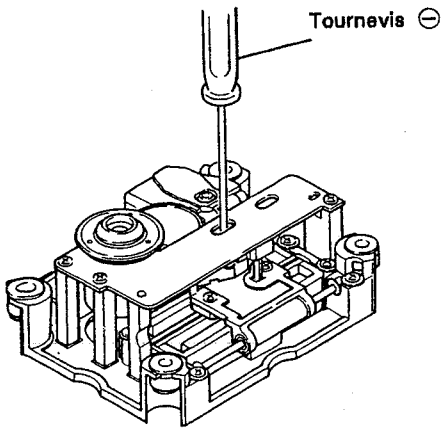


Figure 7-7

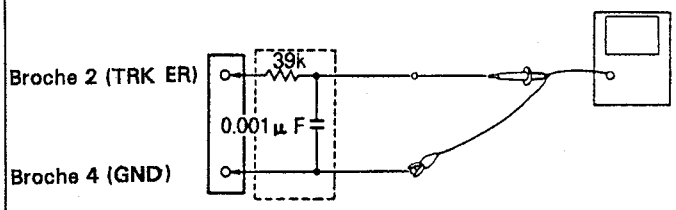


Figure 7-8

Procédure	Réglage d'oscilloscope V	Réglage d'oscilloscope H	Point d'essai	Composant de réglage	Poste de contrôle/ Spécification de réglage	Procédure de réglage
6 Réglage de l'équilibre d'alignement						
	0. 5V/div	5 msec/div	Broche 2 de TP1 (TRK ER)	VR5 (TRK BAL)		• Installer le disque d'essai. • Passer au mode d'essai (voir page 50). • Déplacer le capteur près du centre du disque en utilisant les JP MANUAL SEARCH FWD. • Appuyer sur les touches TRACK FWD (▷▷|) et PLAY (▷) pour faire tourner le disque. • Tout en observant TRK ER (erreur d'alignement) à la broche 2 de TP1 sur l'oscilloscope, ajuster VR5, TRK BAL (équilibrage d'alignement) pour éliminer la composante CC de l'erreur d'alignement.

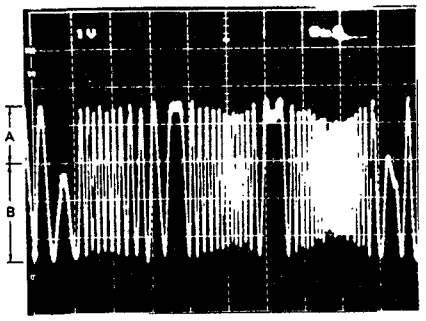


Photo 7 – 4 avec la composante CC

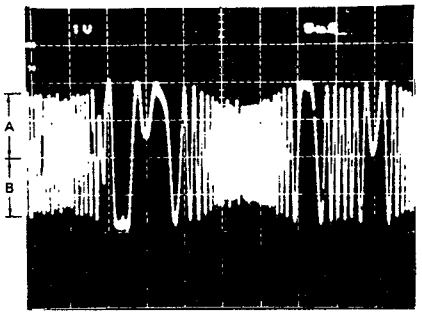
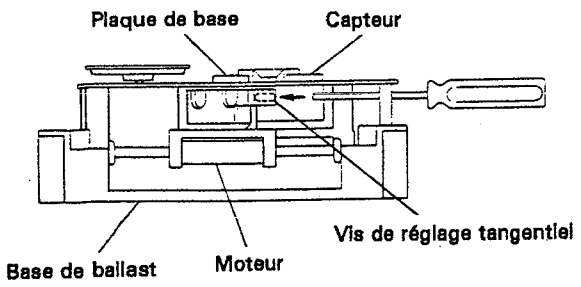


Photo 7-5 sans la composante CC

7 Réglage de la vis tangentielle (qui doit être effectué avec le mécanisme déposé ou avec l'ensemble de plaque audio sur l'arrière déposé)



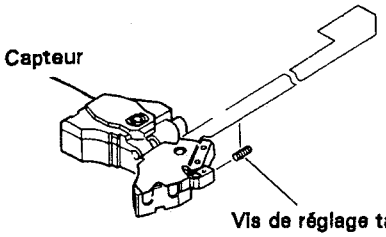
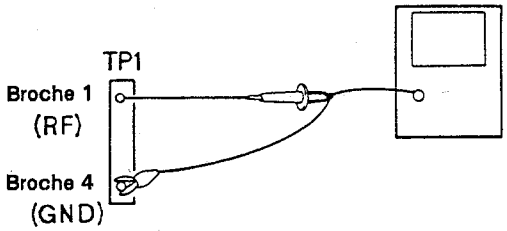


Figure 7-9

- Passer au mode d'essai (voir page 50).
- Ouvrir le plateau et installer le disque.
- Déplacer le capteur près du centre du disque en utilisant les JP MANUAL SEARCH FWD.
- Insérer un tournevis hexagonal approprié sur la vis de réglage tangentiel par l'arrière du mécanisme.
- Refermer le plateau.

Remarque : Ne pas se servir d'un tournevis à tête hexagonale en forme de L. Utiliser un tournevis droit de la manière indiquée dans la figure 7-9. S'il n'y a qu'un tournevis hexagonal en forme de L de disponible, le plateau doit être déposé (voir l'article 1 à la page 53 "5. Réglage de la grille").

- Appuyer sur les touches TRACK FWD (▷▷\|), PLAY (▷) et PAUSE (▯▯) dans cet ordre pour fermer tous les servos (le témoin PAUSE s'allume).

Procédure	Réglage d'oscilloscope V	Réglage d'oscilloscope H	Point d'essai	Composant de réglage	Poste de contrôle/ Spécification de réglage	Procédure de réglage
		200nsec/div	Broche 1 de TP1 (Sortie RF)	Vis de réglage tangentiel	Mire la plus nette possible	• Appuyer sur les touches TRACK FWD (▷▷I), PLAY (▷) et PAUSE (▯▯) dans cet ordre pour fermer les servos de mise au point, d'axe et d'alignement. • Tout en observant la sortie RF à la broche 1 de TP1 sur l'oscilloscope, agir sur la vis de réglage tangentiel pour obtenir une mire nette. • Placer la vis de réglage tangentiel à mi-course entre les deux réglages où la mire commence à devenir floue quand la vis est tournée dans le sens des aiguilles d'une montre et dans le sens contraire. La mire la plus nette possible peut être obtenue lorsqu'elle a l'air nette et que les losanges de la mire sont formées avec des lignes les plus fines possible (voir figure 7-8).  Figure 7-10 Remarque : Pendant ce réglage, relever légèrement le tournevis à tête hexagonale pour que le capteur ne s'abaisse pas.

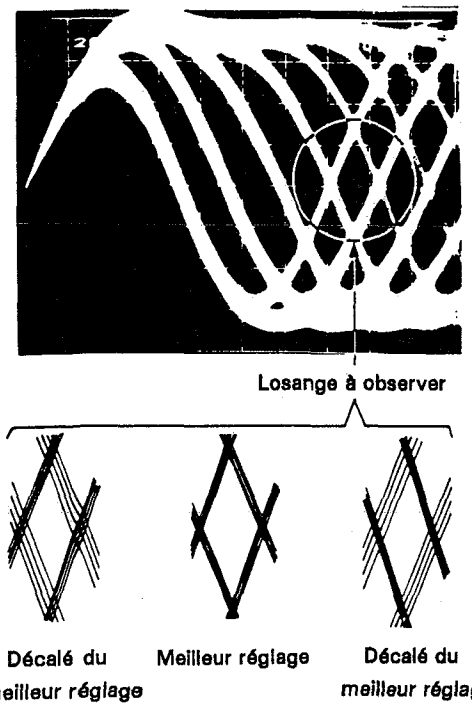


Photo 7-6

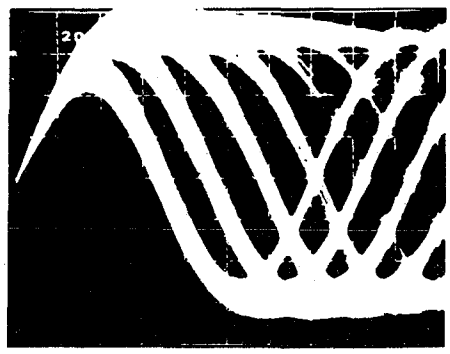


Photo 7-7

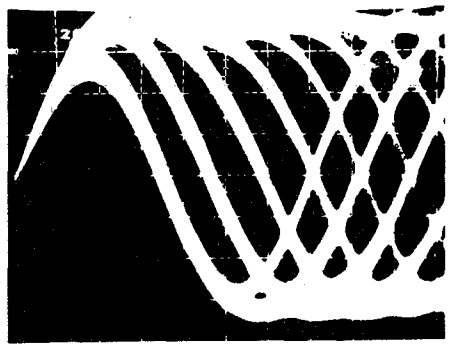


Photo 7-8

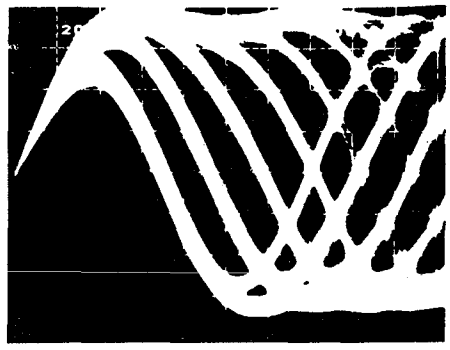


Photo 7-9

Procédure	Réglage d'oscilloscope V	Réglage d'oscilloscope H	Point d'essai	Composant de réglage	Poste de contrôle/ Spécification de réglage	Procédure de réglage
7	Réglage radial					
			Broche 1 de TP1 (Sortie RF)	Réglage de la vis de réglage radial	Mire la plus nette possible	Ce réglage ne peut être effectué qu'après avoir retiré le plateau de disque. Remarque : Se reporter à "5. Réglage de la grille (2)" de la page 55 pour le retrait du plateau. • Installer le disque d'essai. • Passer au mode d'essai (voir page 50). • Déplacer le capteur près du centre de sorte que la vis de réglage tangentiel soit visible par la surface supérieure en utilisant les JP MANUAL SEARCH FWD (voir figure 7-5). • Appuyer sur les touches TRACK FWD (▷▷I), PLAY (▷) et PAUSE (▯▯) dans cet ordre pour fermer tous les servos (le témoin PAUSE s'allume). • Tout en observant la sortie RF à la broche 1 de TP1 sur l'oscilloscope, agir sur la vis de réglage radial pour obtenir une mire nette (figure 7-11). • Placer la vis de réglage radial à mi-course entre les deux réglages où la mire commence à devenir floue quand la vis est tournée dans le sens des aiguilles d'une montre et dans le sens contraire. La mire la plus nette possible peut être obtenue lorsqu'elle a l'air nette et que les losanges de la mire sont formées avec des lignes les plus fines possible (voir figure 7-8). • Répéter au moins deux fois et de manière alternative les réglages tangentiel et radial.

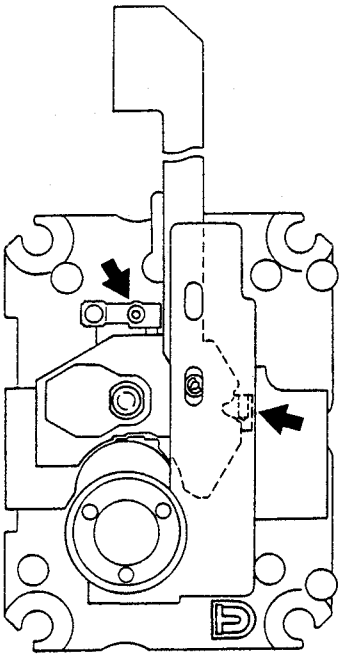


Figure 7-11

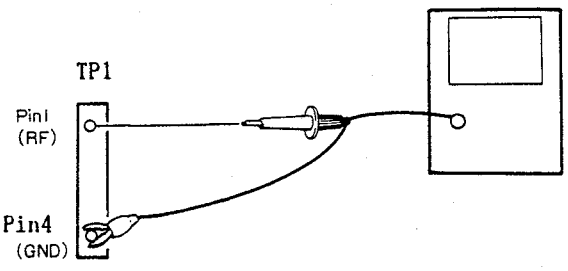


Figure 7-12

Procédure	Réglage d'oscilloscope V	Réglage d'oscilloscope H	Point d'essai	Composant de réglage	Poste de contrôle/ Spécification de réglage	Procédure de réglage
						Remonter le plateau du disque selon la procédure suivante après avoir terminé les réglages. 1. Retirer le disque, puis l'entretoise. 2. Tout en relevant de la main droite la partie Ⓑ du porte-attache dans la figure 7-4, tenir la partie Ⓒ du plateau de la main gauche (tenir la bille d'acier Ø4 avec l'index gauche pour ne pas laisser tomber la bille), insérer le plateau tout en mettant la base coulissante dans la partie en plastique de la base de chargement, de la manière indiquée dans la figure 7-13. (Prendre soin à ne pas endommager le panneau avant lorsque son côté avant entre en contact avec le roulement de la base coulissante dans la section de la bille d'acier Ø4.) 3. Insérer la base coulissante dans les deux parties en plastique à l'arrière de la base de chargement (figure 7-14) 4. Insérer à fond le plateau.

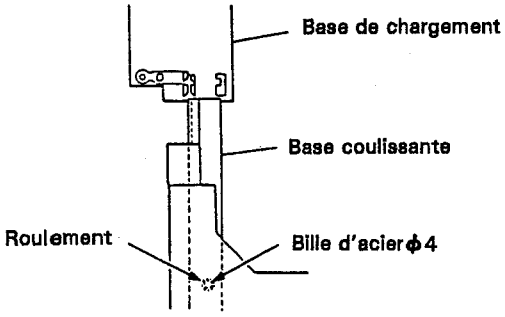


Figure 7-13

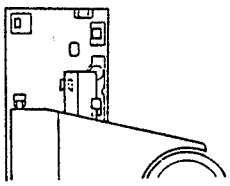


Figure 7-14

Procédure	Réglage d'oscilloscope V	Réglage d'oscilloscope H	Point d'essai	Composant de réglage	Poste de contrôle/ Spécification de réglage	Procédure de réglage
9	Réglage du gain de mise au point					
	CH1(X), CH2(Y), 20 mV/div, 5 mV/div (sonde : 10:1)		Axe des X Broche 5 de TP1 (FCS IN) Axe des Y Broche 6 de TP1 (FCS ER)	VR3 (FCS GAN)	Différence de phase de 90°	Raccorder l'oscillateur à l'oscilloscope, de la manière indiquée dans la figure 7-15, l'alimentation de l'oscillateur étant coupée (OFF). • Mettre l'appareil en mode de lecture (PLAY)normal. • Mettre l'oscillateur sous tension (ON) et le régler pour fournir un signal de 1,2 kHz 1 Vc-c. Remarque : Certains oscillateurs déchargent une tension CC lors de leur mise sous tension. Dans ce cas, raccorder l'oscillateur après l'avoir mis sous tension. • Ajuster VR3, FCS BAN (gain de mise au point) de sorte que la figure de Lissajou devienne un cercle horizontal sur l'oscilloscope (différence de phase de 90°).

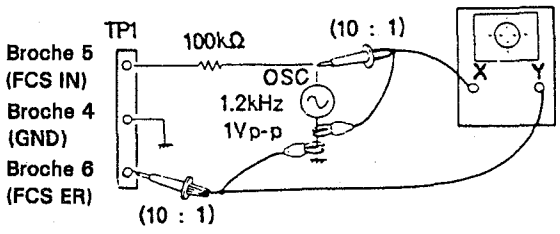
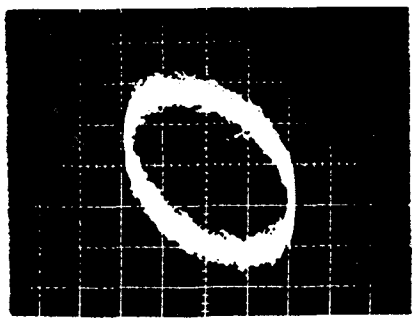
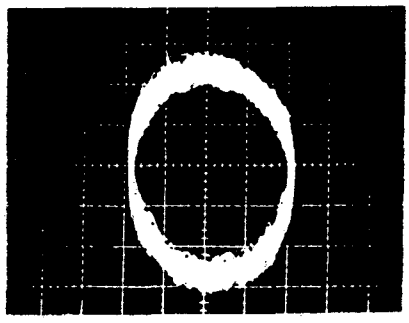


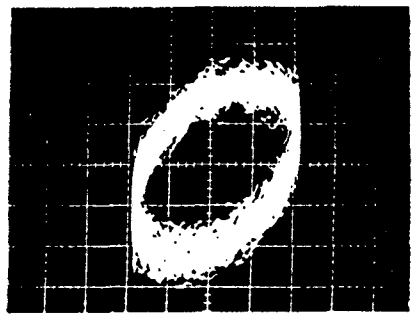
Figure 7-15



Gain sur-compensé
Photo 7-10



Gain optimal
Photo 7-11



Gain sous-compensé
Photo 7-12

Pro-cédure	Réglage d'oscilloscope		Point d'essai	Composant de réglage	Poste de contrôle/ Spécification de réglage	Procédure de réglage
	V	H				
10	Réglage du gain d'alignement					
	CH1(X), CH2(Y), 50 mV/div, 5 mV/div (sonde : 10:1)		Axe des X Broche 3 de TP1 (TRK IN) Axe des Y Broche 2 de TP1 (TRK ER)	VR4 (TRR GAN)	Différence de phase de 90°	Raccorder l'oscillateur à l'oscilloscope, de la manière indiquée dans la figure 7-16, l'alimentation de l'oscillateur étant coupée (OFF). • Mettre l'appareil en mode de lecture (PLAY) normal. • Mettre l'oscillateur sous tension (ON) et le régler pour fournir un signal de 1,2 kHz 2 Vp-p. Remarque : Certains oscillateurs déchargent une tension CC lors de leur mise sous tension. Dans ce cas, raccorder l'oscillateur après l'avoir mis sous tension. • Ajuster VR4, TRK BAN (gain d'alignement) de sorte que la figure de Lissajou devienne un cercle horizontal sur l'oscilloscope (différence de phase de 90°).

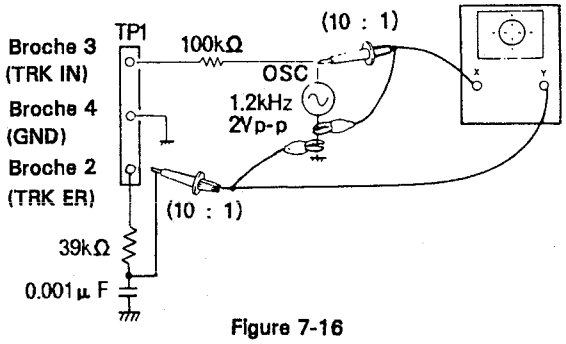
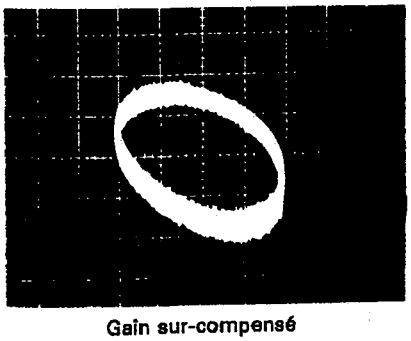
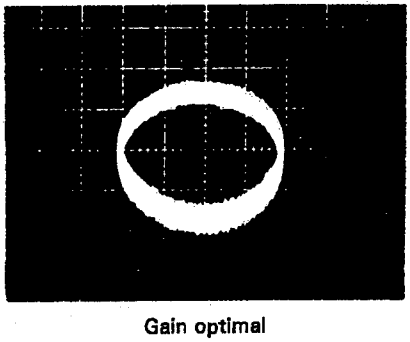


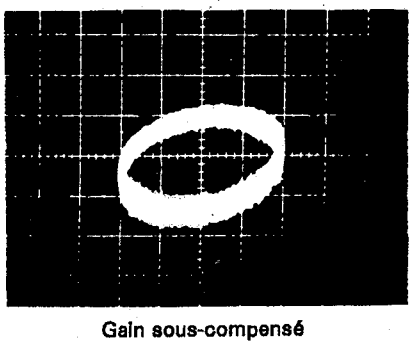
Figure 7-16



Gain sur-compensé
Photo 7-13



Gain optimal
Photo 7-14



Gain sous-compensé
Photo 7-15

Procédure	Réglage d'oscilloscope V	Réglage d'oscilloscope H	Point d'essai	Composant de réglage	Poste de contrôle/ Spécification de réglage	Procédure de réglage
11	Réglage de la fréquence libre VCO					
			Broche 2 de TP2	VR 8 (VCO.ADJ)	4,275 ±0,025 MHz	• Passer au mode d'essai (voir page 50). •* Court-circuiter les cavaliers de l'ensemble (ASY) et de masse (GND) à l'aide d'un tournevis ⊖ ou d'un outil analogue (voir figure 7-17). • Raccorder la broche 2 de TP2 à un fréquencemètre capable de mesurer des fréquences de 10 MHz et au-delà. • Ajuster VR8, VCO ADJ (réglage de la fréquence libre VCO) de sorte que la valeur du fréquencemètre devienne 4,275 ±0,025 MHz.
12	Vérification de la forme S (erreur de mise au point)					
			Broche 6 de TP1 (FCS ER)			• Passer au mode d'essai (voir page 50). • Mettre la broche 5 de TP1 (FCS IN : gain de mise au point) à la masse (GND). • Appuyer sur la touche TRACK FWD (▷▷I) et observer la forme d'onde de la broche 6 (FCS ER : gain de mise au point) de TP1.

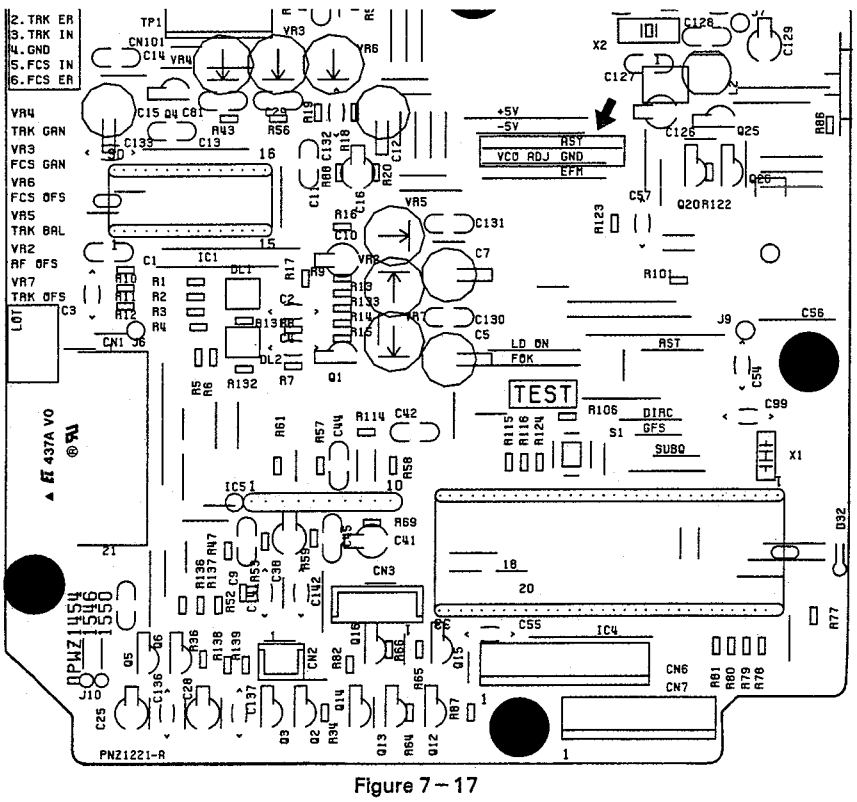


Figure 7 – 17

Procédure	Réglage d'oscilloscope		Point d'essai	Composant de réglage	Poste de contrôle/ Spécification de réglage	Procédure de réglage
	V	H				
13	Réglage du convertisseur N/A (BIT2)					
						• Retirer les six résistances (R500-R505) de l'ensemble de plaque audio indiqué dans la figure 8.

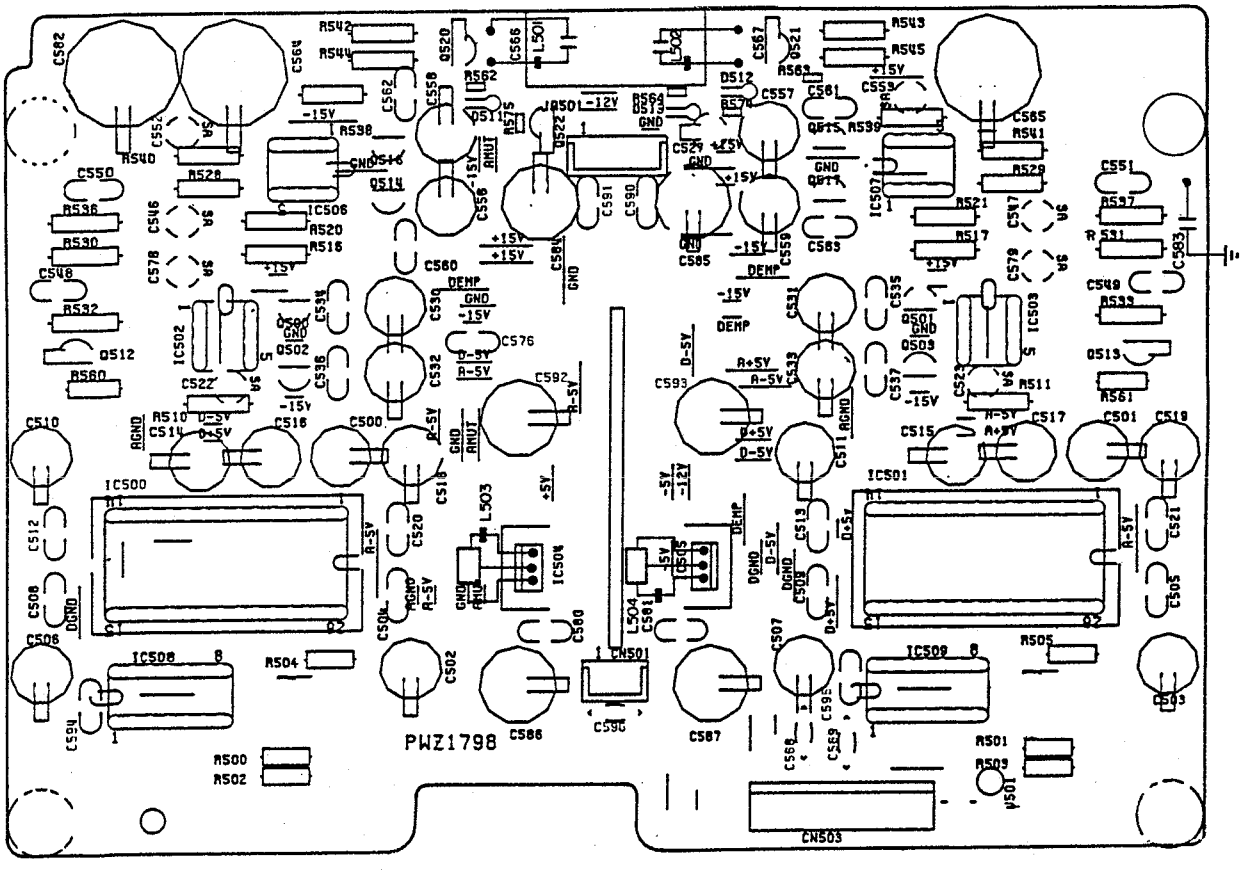


Figure 8

7. AJUSTE

Los ajustes siguientes se han realizado de acuerdo al orden dado.

• Ítemes de ajustes

1 Ajuste de desviación de error de seguimiento, desviación de enfoque y desviación de RF.
2 Ajuste del nivel RF.
3 Comprobación de potencia LD (diodo de láser).
4 Comprobación de seguro de enfoque y seguro de husillo.
5 Ajuste de rejilla.
6 Ajuste del equilibrio de seguimiento.
7 Ajuste del tornillo tangencial.
8 Ajuste del tornillo radial.
9 Ajuste de la ganancia de enfoque.
10 Ajuste de la ganancia de seguimiento.
11 Ajuste de la frecuencia de funcionamiento libre de VCO.
12 Convertidor D/A.

• Instrumentos requeridos para los ajustes

1 Osciloscopio de canal doble
2 Medidor de potencia óptico
3 Disco de prueba (YEDS-7), disco de 8 cm
4 Filtro de ajuste de ganancia de bucle
5 Generador de señal
6 Frecuencímetro
7 Otras herramientas estándares

• Modo de prueba

Tdos los ajustes se tienen que llevar a cabo en el modo de prueba.

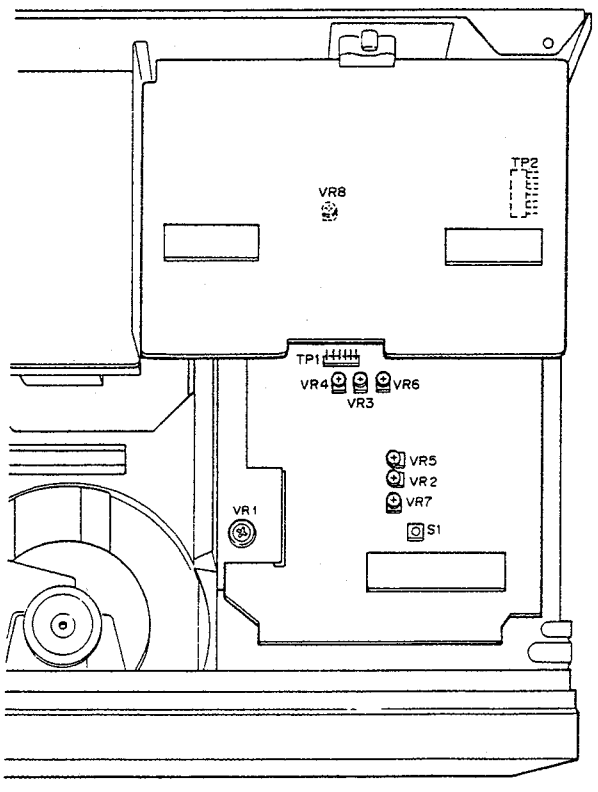
Los procedimientos para el ajuste y cancelación del modo de prueba.

1 Active mediante el interruptor de alimentación (S301) para ajustar el modo de prueba mientras se sostiene presionado el interruptor de modo de prueba (S1).
2 Desactive mediante el interruptor de alimentación para cancelar el modo de prueba.

En el modo de prueda, las teclas tienen las funciones mostradas en la tadla 7-1.

• Ajuste de las VR (resistencias variables) y sus nombres

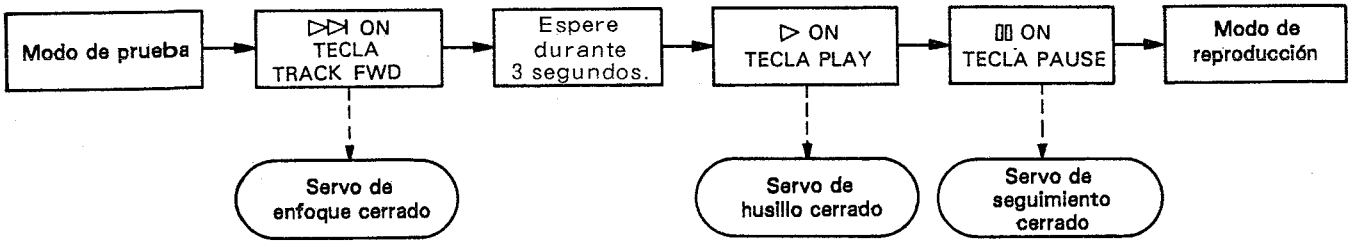
VR1: Potencia de láser
VR2: Desviación de RF (RF OFS)
VR3: Ganancia de enfoque (FCS GAN)
VR4: Ganancia de seguimiento (TRK GAN)
VR5: Equilibrio de seguimiento (TRK BAL)
VR6: Desviación de enfoque (FCS OFS)
VR7: Desviación de seguimiento (TRK OFS)
VR8: VCO ajuste (VCO.ADJ)



Componentes a ser ajustados

Cada servo es cerrado o abierto independientemente por una operación apropiada en el modo de prueba. Para ajustar el modo a reproducción normal, cada servo debe ser cerrado uno por uno en una secuencia en serie. En el modo de prueba, no puede ingresar el modo de reproducción presionando la tecla PAUSE (⏸). Para ingresar el modo de reproducción desde el modo de parada, las teclas deben presionarse en la siguiente secuencia.

* Cada servo debe ser operado en una secuencia en serie en el modo de prueba.



• FUNCIONES DE LAS TECLAS EN EL MODE DE PRUEBA

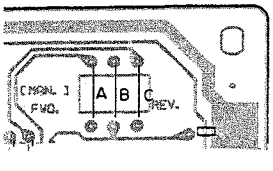
Símbolo	Nombre de tecla	Función en el modo de prueba	Observaciones
⏭	TRACK FWD	Servo de enfoque cerrado	Para activar el diodo de láser, mueva el actuador de enfoque hacia arriba y abajo, y cierre el servo de enfoque.
▷	PLAY	Servo de husillo cerrado	Para cerrar el servo en el modo CLV-A después de activar el motor del husillo.
⏸	PAUSE	Servo de seguimiento cerrado/abierto	Para realizar las operaciones de cambio. Cuando está presionado, el servo de seguimiento está cerrado y el sistema cambia al estado de reproducción. (El servo de enfoque y el servo de husillo deben estar cerrado cuando se lo presiona.) Entonces se enciende el indicador PAUSE. Presione nuevamente para abrir el servo de seguimiento.
□	STOP	Parada	Para parar todos los servos y reposicionar el sistema al estado inicial.
⏏	OPEN/CLOSE	Apertura/cerrado (Bandeja de disco)	Para abrir o cerrar la bandeja de disco. El lector, no obstante, no retornará a la posición inicial cuando se abra la bandeja, y permanecerá en el estado en que se encuentra cuando se lo cierra.
	DISPLAY (MANUAL, OFF SEARCH FWD en el modo remoto)	Avance de carro	Para mover rápidamente el carro (en un régimen de alrededor de 1 cm/seg) hacia el radio exterior. No mueva el demasiado alejado ya que no hay dispositivos seguros para parar el carro.
	OUTPUT SEL (MANUAL SEARCH REV en el modo remoto)	Inversión de carro	Para mover rápidamente el carro (en un régimen de alrededor de 1 cm/seg) hacia el radio exterior. No mueva el demasiado alejado ya que no hay dispositivos seguros para parar el carro.

Tabla 7-1

Las teclas anteriores pueden usarse para control remoto en el modo de prueba.

• Cuando realice una búsqueda manual

* Conecte los puentes de contacto JP en el tablero de circuito de control para realizar una búsqueda manual (MANUAL SEARCH).



Disposición del tablero de circuito de control Conexión entre JP, C y B: MANUAL SEARCH REV (inversión de búsqueda manual) Conexión entre JP, A y B: MANUAL SEARCH FWD (avance de búsqueda manual)

Procedimiento	Gama del osciloscopio V	Gama del osciloscopio H	Punto de prueba	Componente para ajuste	Ítem de comprobación /especificación de ajuste	Procedimiento de ajuste
1	Ajuste de la desviación de error de seguimiento, desviación de enfoque y desviación de RF.					
					Décalage d'erreur d'alignement	• Cambie al modo de prueba (vea la página 66).
				VR5 (TRK BAL)	45°	• Gire VR5, TRK BAL (equilibrio de seguimiento) alrededor de 45° hacia la izquierda del centro.
			Contacto 2 en TP1 (TRK ER)	VR7 (TRX OFS)	0V ±50 mV	• Ajuste VR7, TRK OFS (desviación de seguimiento) de modo que la tensión en TRK ER (error de seguimiento) en el contacto 2 de TR1 sea de 0V ±50 mV.
			Contacto 6 en TP1 (FCS ER)	VR6 (FCS OFS)	Desviación de enfoque 0V ±50 mV	• Ajuste VR6, FCS OFS (desviación de enfoque) de modo que la tensión de FCS ER (error de enfoque) en el contacto 6 de TR1 sea de 0V ± 50mV.
			Contacto 1 en TP1 (salida de RF)	VR2 (RF. OFS)	Desviación de RF 100 mV ±50 mV	• Ajuste VR2, RF OFS (desviación de RF) de modo que la tensión (salida de RF) en el contacto 1 de TR1 sea 100 mV ±50mV.
						Nota: Cuando ajuste la desviación del error de seguimiento, siempre se debe realizar el "ajuste de equilibrio de seguimiento en el procedimiento 6".
2	Ajuste de nivel de RF					
			Contacto 1 de TP1 (salida de RF)	VR1 (potencia de láser)	$1.5V^{+0.2V}_{-0V}$	• Cambie al modo de prueba (vea la página 66). • Mida la tensión P-P en la onda de RF, reproduciendo el disco de prueba y conectando el contacto 1 de TP1 (salida de RF) al osciloscopio. • Ajuste VR1 de modo que la tensión sea de $1,5V^{+\ 0,2V}_{-\ 0V}$
3	Comprobación de la potencia de LD (diodo de láser)					
				Comprobar	0,13 mV o menos	• Cambiar al modo de prueba (vea la página 66). • Active el LD (diodo de láser) presionando la tecla TRACK FWD (▷▷|). • Compruebe que la alimentación LD sea de 0,13 mV o menos, colocando el sensor del medidor de potencia óptico recto sobre los lentes del objeto.

Pro-cedimiento	Gama del osciloscopio V	Gama del osciloscopio H	Punto de prueba	Componente para ajuste	Ítem de comprobación /especificación de ajuste	Procedimiento de ajuste
4	Ajuste del seguro de enfoque y seguro de husillo					
	V 0.5V/div	H 100msec/div	Contacto 1 en TP1 (salida de RF)		Con la salida de RF Rotación la dirección positiva (hacia la derecha)	• Ajuste el disco de prueba. • Cambie al modo de prueba (vea la página 66). • Mueva el lector cerca del centro del disco usando los puentes de contacto JP de MANUAL SEARCH FWD. • Mientras observa la salida de RF en el contacto 1 de TP1 sobre el osciloscopio, compruebe que las señales de RF son generadas después de que se presiona la tecla TRACK FWD (▷▷I). • Presione la tecla PLAY (▷) y compruebe que el disco gira en la dirección positiva (hacia la derecha), en un régimen prácticamente constante (alrededor de 300 rpm cerca del centro), y no gira en la dirección negativa o gira con una velocidad irregular.
5	Ajuste de la rejilla (1) (en el caso de un disco de 8 cm)					
						• Cambie al modo de prueba (vea la página 66) • Mueva el lector cerca del radio interior usando el puente de contacto JP de MANUAL SEARCH FWD, de modo que el tornillo de ajuste de rejilla del lector pueda verse desde el orificio en el lado del motor de husillo, uno de los orificios elípticos se localiza en la placa base del servomecanismo. • Inserte un destornillador de punta plana adecuado (destornillador de precisión de 2 mm), desde el lado superior del mecanismo como se muestra en la figura 7-1,y cerciórese que el tornillo de ajuste de rejilla puede ser girado. • Coloque el disco.
						• Presione la tecla TRACK FWD (▷▷I) y luego la tecla PLAY (▷) para cerrar el servo de enfoque y servo de husillo (el servo de seguimiento no cierra). • Observe la onda TRER (error de seguimiento) en el contacto 2 de TP1 sobre el osciloscopio. Para realizar esto, inserte el filtro de paso bajo con la frecuencia de corte de 4 kHz entre el contacto 2 (TRER) y contacto 4 (GND) de TP1 (figura 7-2).

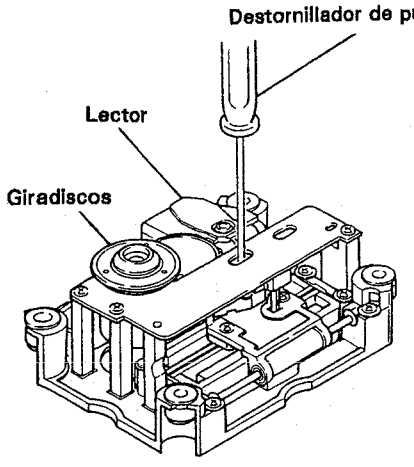


Figura 7-1

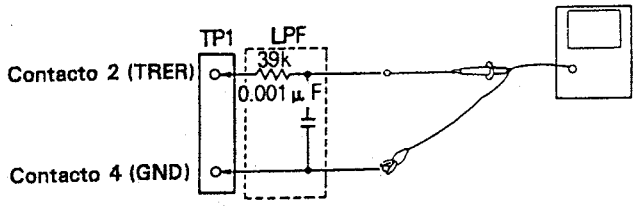


Figura 7-2

Procedimiento	Gama del osciloscopio V	Gama del osciloscopio H	Punto de prueba	Componente para ajuste	Ítem de comprobación /especificación de ajuste	Procedimiento de ajuste
	0.5V/div	5msec/div	Contacto 2 de TP1 (TPK ER)	Tornillo de ajuste de rejilla Tornillo de ajuste de rejilla	Punto cero Amplitud máxima	• Localice el punto cero (vea la foto 7-1) girando el destornillador de punta plana. • Luego localice la primera cresta de la onda (señales de error de seguimiento; vea la foto 7-3) girando el destornillador de punta plana desde el punto cero hacia la izquierda. Nota: Si se aplica demasiada presión en el destornillador de punta plana, el lector se inclinará en la dirección tangencial, haciendo el ajuste difícil. • Finalmente retire el filtro de paso bajo, y compruebe que la tensión P-P de las señales de error de seguimiento no varían con una gran amplitud cuando el lector se mueve cerca del radio del disco interior y al radio del disco exterior. Si el nivel se desplaza en ±10% o más, gire nuevamente el tornillo de ajuste de rejilla nuevamente para localizar la posición en donde la amplitud de error es máxima.

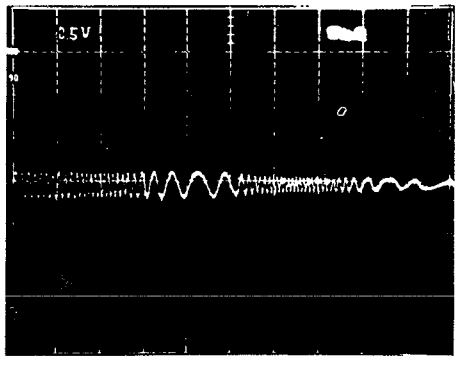


Foto 7-1 Punto cero

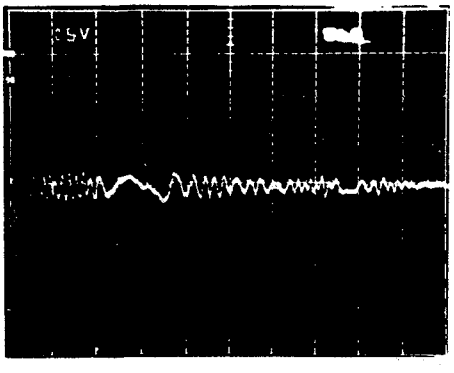


Foto 7-2 Onda desactivada desde el punto cero

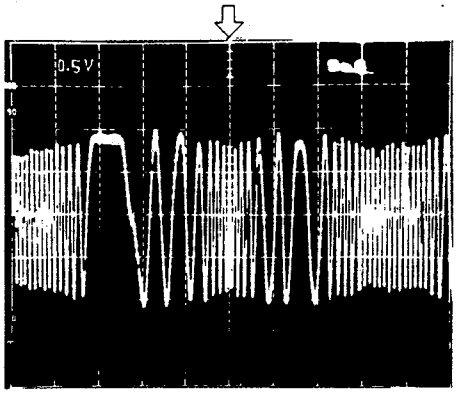
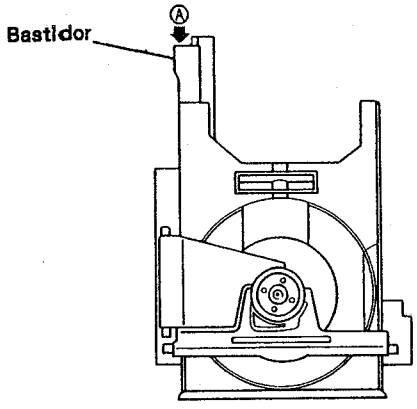
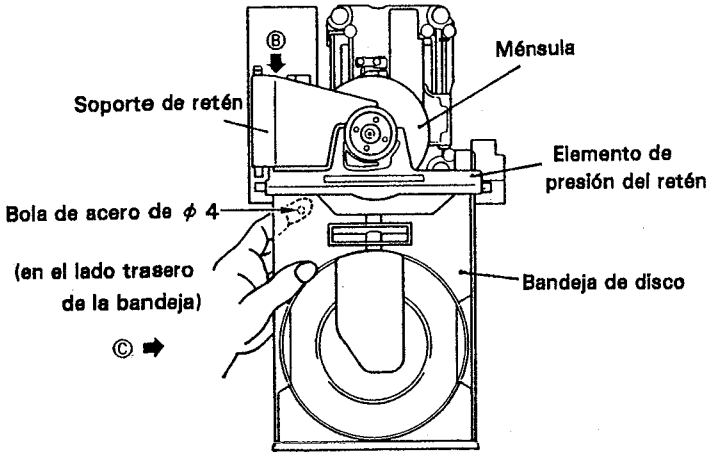
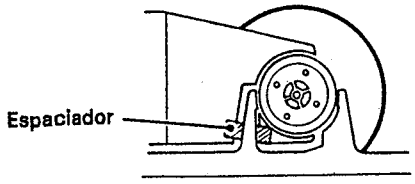
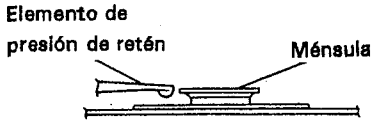


Foto 7-3 Amplitud máxima

Procedimiento	Gama del osciloscopio V	Gama del osciloscopio H	Punto de prueba	Componente para ajuste	Ítem de comprobación /especificación de ajuste	Procedimiento de ajuste
5	Ajuste la rejilla (2) (en el caso de un disco con 60 minutos o más de tiempo de grabación)					
	 Figura 7-3					Los siguientes ajustes deben realizarse después de extraerse la bandeja del disco. • Mientras se presiona el extremo posterior Ⓐ en el bastidor de la figura 7-3, tire de la bandeja del disco (*1) hasta que se detenga (esta posición de parada se muestra en la figura 7−4). (*1) Presionando el extremo posterior Ⓐ del bastidor primero destraba el retén del disco. Sosteniéndola presionado después de destrabarlo, la bandeja de disco puede ser extraída.
	 Figura 7-4					2. Mientras se eleva la parte Ⓑ del soporte de retén en la figura 7-4 con la mano derecha, sostenga y tire la parte Ⓒ de la bandeja con la mano izquierda. Tenga cuidado de no dejar caer la bola de acero de ϕ4 (sostenga la bola con su dedo índice).
	 Figura 7-5					
	 Figura 7-6					

Pro-cedim-iento	Gama del osciloscopio V	Gama del osciloscopio H	Punto de prueba	Componente para ajuste	Ítem de comprobación /especificación de ajuste	Procedimiento de ajuste
						Este ajuste es solamente posible en aquellos discos que tienen depresiones de hasta 115 mm en la dirección radial; no puede ser realizado con un disco de prueba (YEDS-7). • Cambie al modo de prueba de (vea la página 66) • Ajuste el disco de prueba. Mueva el lector al radio exterior de modo que el lector se encuentre sobre la superficie con depresión en el disco, y el tornillo de ajuste de rejilla del lector pueda verse a través del orificio en el servomecanismo (vea la figura 7-7). • Presione la tecla TRACK FWD (▷▷|) y luego la tecla PLAY (▷) para cerrar el servo de enfoque y el servo de husillo (el servo de seguimiento no se cierra). • Inserte el filtro de paso bajo de 4 kHz, y observe la forma de onda TRK ER (error de seguimiento) en el contacto 2 de TP1, sobre un osciloscopio apropiado (vea la figura 7-8).
			Contacto 2 de TP1	Rejilla Rejilla	Punto cero Amplitud máxima	• Localice el punto cero (foto 7-1) girando el destornillador de punta plana. • Luego localice la primera cresta de la onda (señales de error de seguimiento); vea la foto 7-3) girando el destornillador lentamente desde el punto cero hacia la izquierda. Nota: Si se aplica demasiada presión en el destornillador de punta plana, el lector se inclinará en la dirección tangencial, haciendo el ajuste difícil. • Finalmente retire el filtro de paso bajo, y compruebe que la tensión P-P de las señales de error de seguimiento no varían con una gran amplitud cuando el lector se mueve cerca del radio del disco interior y al radio del disco exterior. Si el nivel se desplaza en ±10% o más, gire nuevamente el tornillo de ajuste de rejilla nuevamente para localizar la posición en donde la amplitud de error es máxima.

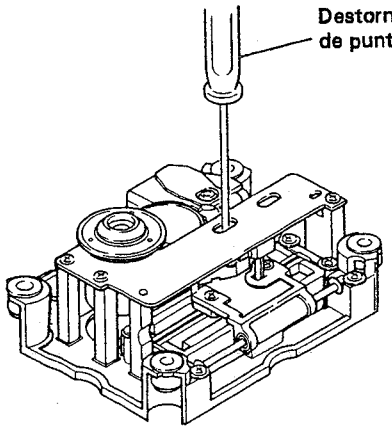


Figura 7-7

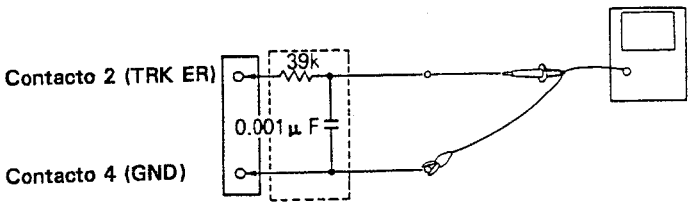


Figura 7-8

Pro-cedim-iento	Gama del osciloscopio V	Gama del osciloscopio H	Punto de prueba	Componente para ajuste	Ítem de comprobación /especificación de ajuste	Procedimiento de ajuste
6	Ajuste del equilibrio de seguimiento					
	0.5V/div	5msec/div	Contacto 2 de TP1 (TRK ER)	VR5 (TRK BAL)		• Coloque el disco de prueba. • Cambie al modo de prueba (vea la página 66). • Mueva el lector cerca del centro del disco usando los JP MANUAL SEARCH FWD. • Presione la tecla TRACK FWD (▷▷I) y luego la tecla PLAY (▷) para girar el disco. • Mientras observa el TKR ER (error de seguimiento) en el contacto 2 de TP1 en el osciloscopio, ajuste VR5, TRK BAL (equilibrio de seguimiento) de modo que la componente de CC en el error de seguimiento se convierta en cero.
7	Ajuste del tornillo tangencial (que debe realizarse con el mecanismo desmontado o con el conjunto de tablero de audio en la parte trasera extraída)					

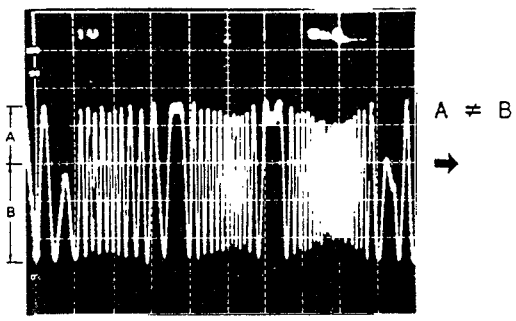


Foto 7-4 Con componente de CC

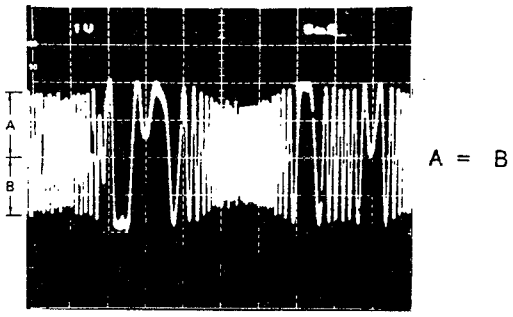


Foto 7-5 Sin componente de CC

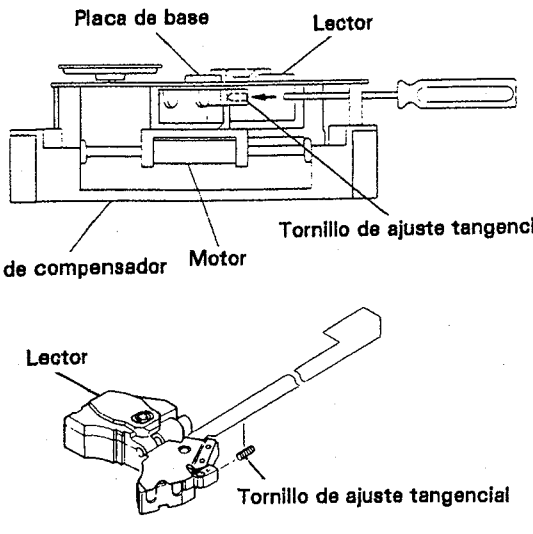
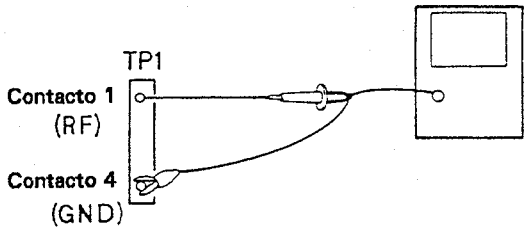


Figura 7-9

• Cambie al modo de prueba (vea la página 66).
• Mueva el lector cerca del centro del disco mediante el uso de los JP de MANUAL SEARCH FWD.
• Cierre la bandeja.
Nota: No utilice un destornillador de cabeza hexagonal de tipo L. Use un destornillador recto como se muestra en la figura 7-9. Si solamente se dispone de un destornillador de tipo L, la bandeja debe extraerse (refiérase al ítem 1 para el ajuste de rejilla en el procedimiento 5 en la página 69).
• Cierre todos los servos presionando la tecla TRACK FWD (▷▷I), la tecla PLAY (▷), y la tecla PAUSE (II) en ese orden (el indicador de pausa se enciende).

Procedimiento	Gama del osciloscopio		Punto de prueba	Componente para ajuste	Ítem de comprobación /especificación de ajuste	Procedimiento de ajuste
	V	H				
		200nsec/div	Contacto 1 de TP1 (salida de RF)	Tornillo de ajuste tangencial	Mejor ajuste de patrón I	• Cierre los servos de enfoque, seguimiento y husillo presionando la tecla TRACK FWD (▷▷I), la tecla PLAY (▷), y la tecla PAUSE (▯▯) en ese orden. • Mientras observa la salida de RF en el contacto 1 de TP1 sobre el osciloscopio, ajuste el tornillo de ajuste tangencial de modo que patrón I se vea fino. • Coloque el tornillo de ajuste tangencial en el punto medio entre los dos ajustes en donde el patrón I comienza a distorsionarse mientras gira este tornillo hacia la derecha o hacia la izquierda. El mejor patrón I puede obtenerse cuando el patrón I se ve fino y los diamantes en el patrón I están formados con las líneas más finas posibles (vea la figura 7-8).  Figura 7-10 Nota: Mientras ajusta, eleve el destornillador de cabeza hexagonal un poco más de modo que el lector no se mueva hacia abajo.

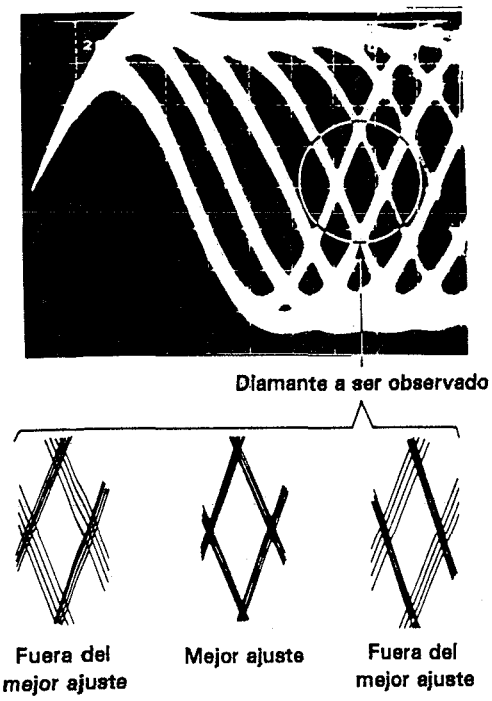


Foto 7-6

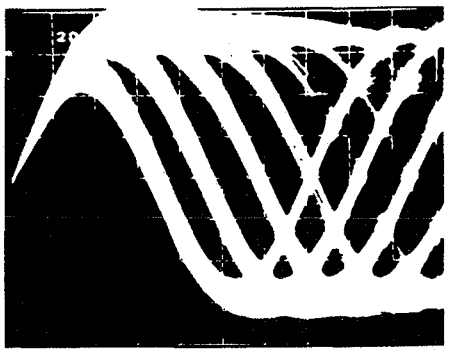


Foto 7-7

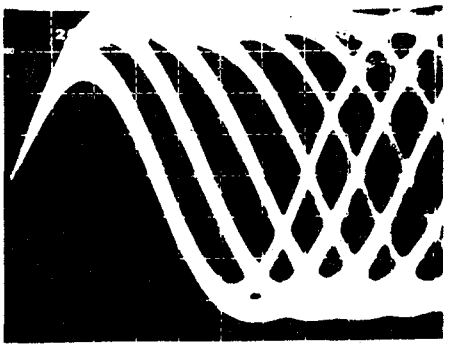


Foto 7-8

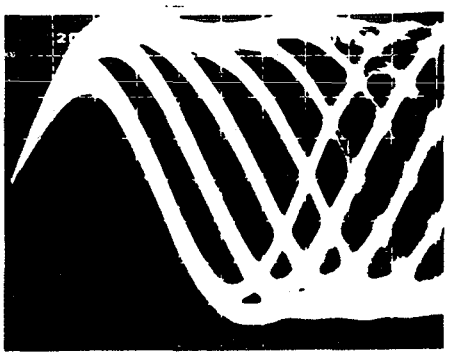


Foto 7-9

Pro-cedim-iento	Gama del osciloscopio V	Gama del osciloscopio H	Punto de prueba	Componente para ajuste	Ítem de comprobación /especificación de ajuste	Procedimiento de ajuste
8	Ajuste radial					
						Este ajuste debe realizarse después que la bandeja del disco se haya retirado. Nota: Refiérase a "5. Ajuste de rejilla (2)" en la página 71 para extraer la bandeja. • Ajuste el disco de prueba. • Cambie al modo de prueba (vea la página 66). • Mueva el lector cerca del centro del disco de modo que el tornillo de ajuste tangencial pueda verse desde la superficie superior usando los puentes de contacto JP de MANUAL SEARCH FWD (vea la figura 7-5). • Cierre todos los servos presionando la tecla TRACK FWD (▷▷|), la tecla PLAY (▷) y la tecla PAUSE (▯▯) en ese orden (el indicador de pausa se ilumina).
			Contacto 1 de TP1 (salida de RF)	Ajuste de tornillo de ajuste radial	Mejor ajuste de patrón I	• Mientras observa la salida de RF en el contacto 1 de TP1 sobre el osciloscopio, ajuste el tornillo de ajuste radial de modo que el patrón I se observe fino (figura 7-11). • Coloque el tornillo de ajuste tangencial en el punto medio entre los dos ajustes en donde el patrón I comienza a distorsionarse, mientras gira este tornillo hacia la derecha o hacia la izquierda. El mejor patrón I puede obtenerse cuando el patrón I se ve fino y los diamantes en el patrón I están formados con las líneas más finas posibles (vea la figura 7-8). • Repita los ajustes radiales y tangenciales alternadamente por lo menos dos veces.

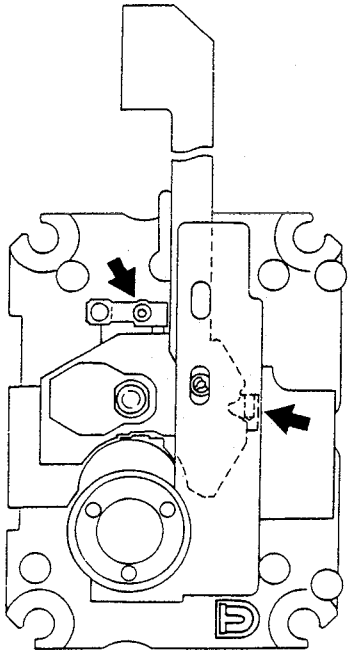


Figura 7-11

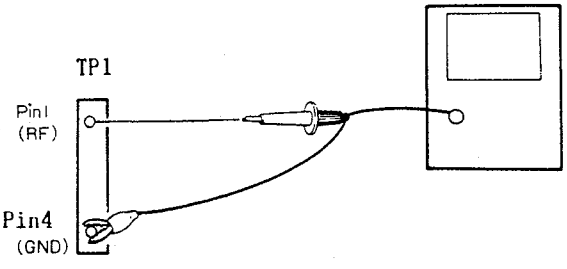


Figura 7-12

Pro-cedim-iento	Gama del osciloscopio V	Gama del osciloscopio H	Punto de prueba	Componente para ajuste	Ítem de comprobación /especificación de ajuste	Procedimiento de ajuste
						Monte la bandeja del disco de acuerdo al siguiente procedimiento después de los ajustes. 1. Extraiga el disco y luego el espaciador. 2. Mientras eleva la parte Ⓑ del soporte de retén en la figura 7-4 con la mano derecha, sostenga la parte Ⓒ de la bandeja con la mano izquierda (sostenga la bola de acero de ø4 con el dedo índice de la mano izquierda para no dejar caer la bola), inserte la bandeja, mientras coloca la base deslizante en la parte plástica sobre la base de carga como se muestra en la figura 7-13. (Tenga cuidado de no dañar el panel delanteró que puede suceder cuando el lado delantero del panel delantero toca la rebaba sobre la base deslizante en la sección de la bola de acero de ø4.) 3. Inserte la base deslizante en las dos partes plásticas en la parte trasera de la base de carga (figura 7-14). 4. Empuje la bandeja en todo su recorrido hacia abajo.

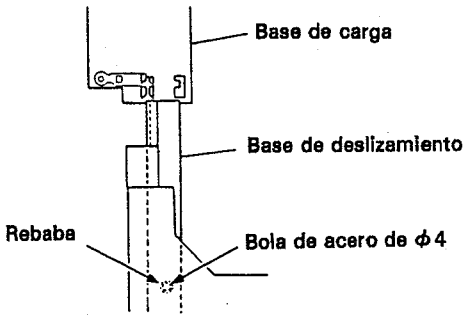


Figura 7-13

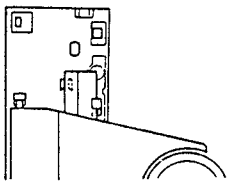


Figura 7-14

Pro-cedim-iento	Gama del osciloscopio V	Gama del osciloscopio H	Punto de prueba	Componente para ajuste	Ítem de comprobación /especificación de ajuste	Procedimiento de ajuste
9	Ajuste la ganancia de enfoque					
	CH1(X), CH2(Y), 20mV/div, 5 mV/div (sonda 10:1)		Eje X Contacto 5 de TP1 (FCS IN) Eje Y Contacto 6 de TP1 (FCS ER)	VR3 (FCS GAN)	Diferencia de fase 90°	Conecte el oscilador al osciloscopio como se muestra en la figura 7-15 mientras la alimentación está desactivada. • Ajuste la unidad al modo de reproducción (PLAY) normal. • Active la alimentación del osciloscopio y genere 1,2 kHz 1 Vp-p. Nota: Algunos osciladores generan una señal de CC cuando la alimentación está activada. En este caso, conecte el oscilador después de haber activado la alimentación. • Ajuste VR3, FCS GAN (ganancia de enfoque), de modo que el círculo Lissajous sobre el osciloscopio se convierta en un círculo horizontal (con 90° para la diferencia de fase).

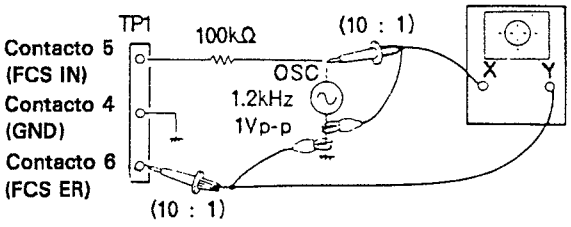
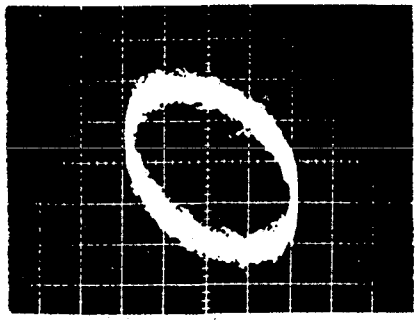
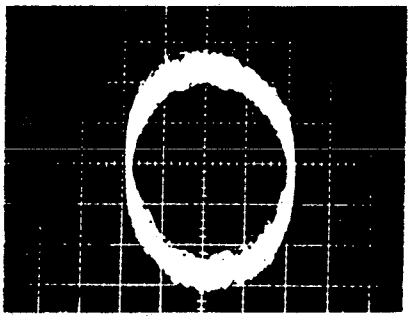


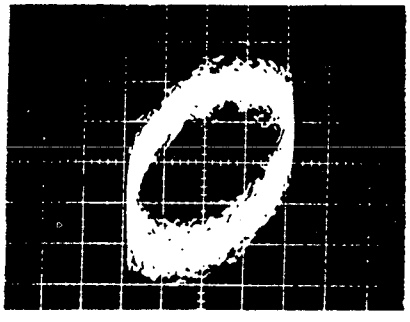
Figura 7-15



Ganancia grande
Foto 7-10



Ganancia óptima
Foto 7-11



Ganancia pequeña
Foto 7-12

Pro-cedim-iento	Gama del osciloscopio V	Gama del osciloscopio H	Punto de prueba	Componente para ajuste	Ítem de comprobación /especificación de ajuste	Procedimiento de ajuste
10	Ajuste de la ganancia de seguimiento					
	CH1(X), CH2(Y), 50 mV/div., 5mV/div. (sonda 10:1)		Eje X Contacto 3 de TP1 (TRK ER) Eje Y Contacto 2 de TP1 (TRK ER)	VR4 (TRK GAN)	Diferencia de fase 90°	• Conecte el oscilador al osciloscopio como se muestra en la figura 7-16 mientras la alimentación está desactivada. • Ajuste unidad al modo de reproducción (PLAY) normal. • Active la alimentación del osciloscopio y genere 1,2 kHz 2 Vp-p. Nota: Algunos osciladores generan una señal de CC cuando la alimentación está activada. En este caso, conecte el oscilador después de haber activado la alimentación. • Ajuste VR4, FCS GAN (ganancia de enfoque), de modo que el círculo Lissajous sobre el osciloscopio se convierta en un círculo horizontal (con 90° para la diferencia de fase).

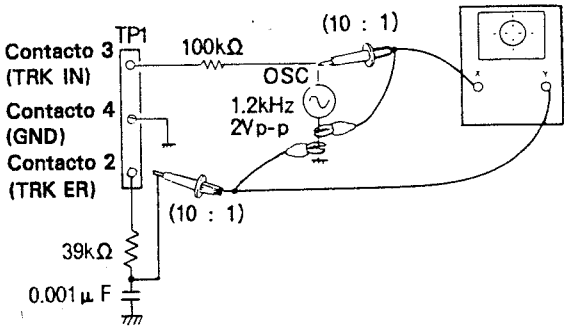
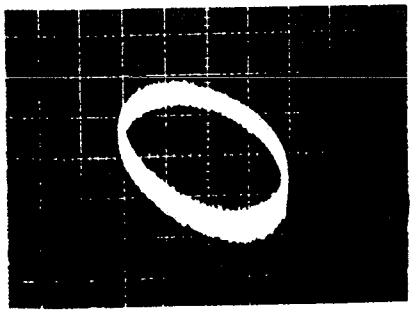
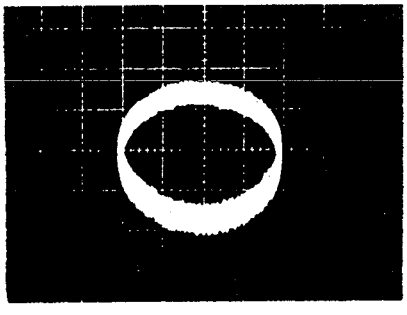


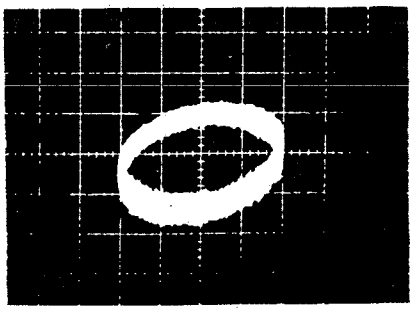
Figura 7-16



Ganancia grande
Foto 7-13



Ganancia óptima
Foto 7-14



Ganancia pequeña
Foto 7-15

Pro-cedimiento	Gama del osciloscopio V	Gama del osciloscopio H	Punto de prueba	Componente para ajuste	Ítem de comprobación /especificación de ajuste	Procedimiento de ajuste
11	Ajuste el funcionamiento libre de VCO					
			Contacto 2 de TP2	VR8 (VCO.ADJ)	4,275 ±0,025 MHz	• Cambie al modo de prueba (vea la página 66). • Derive los puentes de contacto ASY y GND usando un destornillador de punta plana o herramienta similar (vea la figura 7-17). • Conecte el contacto 2 de TP2 para un contador de frecuencia relevante que puede usarse en una frecuencia de 10 MHz o más alta. • Ajuste VR8, VCO ADJ (ajuste de funcionamiento libre de VCO) de modo que el contador de frecuencia indique 4.275 ±0,225 MHz.
12	Comprobación de la forma S (error de enfoque)					
			Contacto 6 de TP1 (FCS ER)			• Cambie al modo de prueba (vea la página 66). • Derive el contacto 5 (FCS IN: en foco) de TP1 a GND. • Presione la tecla TRACK FWD (▷▷I) y observe la forma de onda en el contacto 6 (FCS ER: en foco) de TP1. Figura 7−17

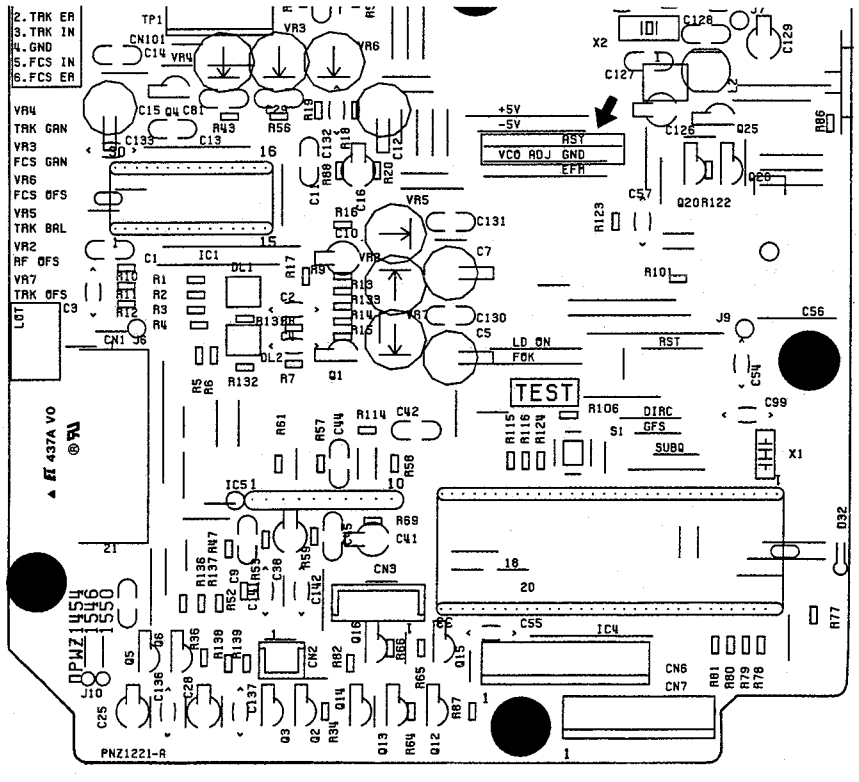


Figura 7−17

Pro-cedim-iento	Gama del osciloscopio		Punto de prueba	Componente para ajuste	Ítem de comprobación /especificación de ajuste	Procedimiento de ajuste
	V	H				
13	Ajuste del convertidor D/A (BIT2)					
						• Extraiga los seis registros (R500-R505) en el conjunto del tablero de audio que se muestra en la figura 8.

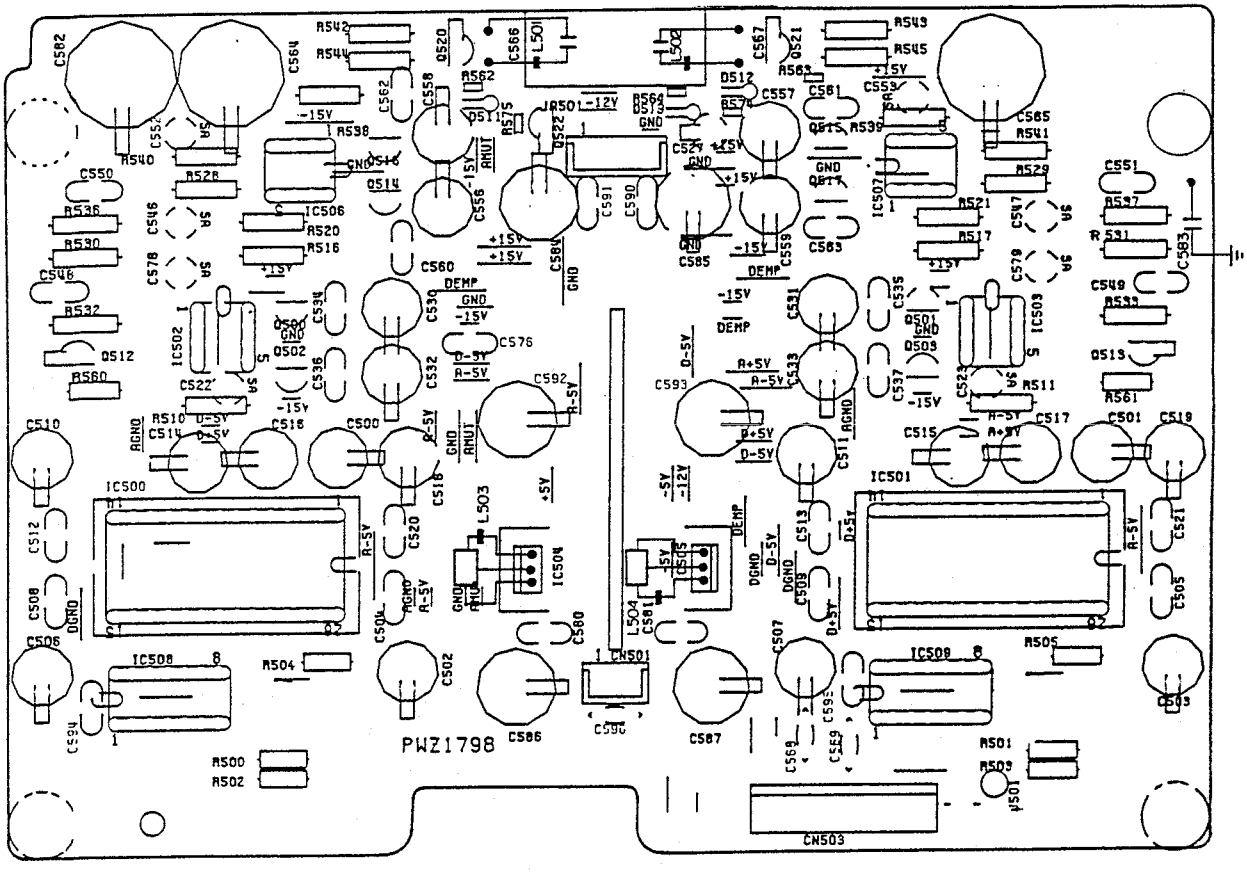
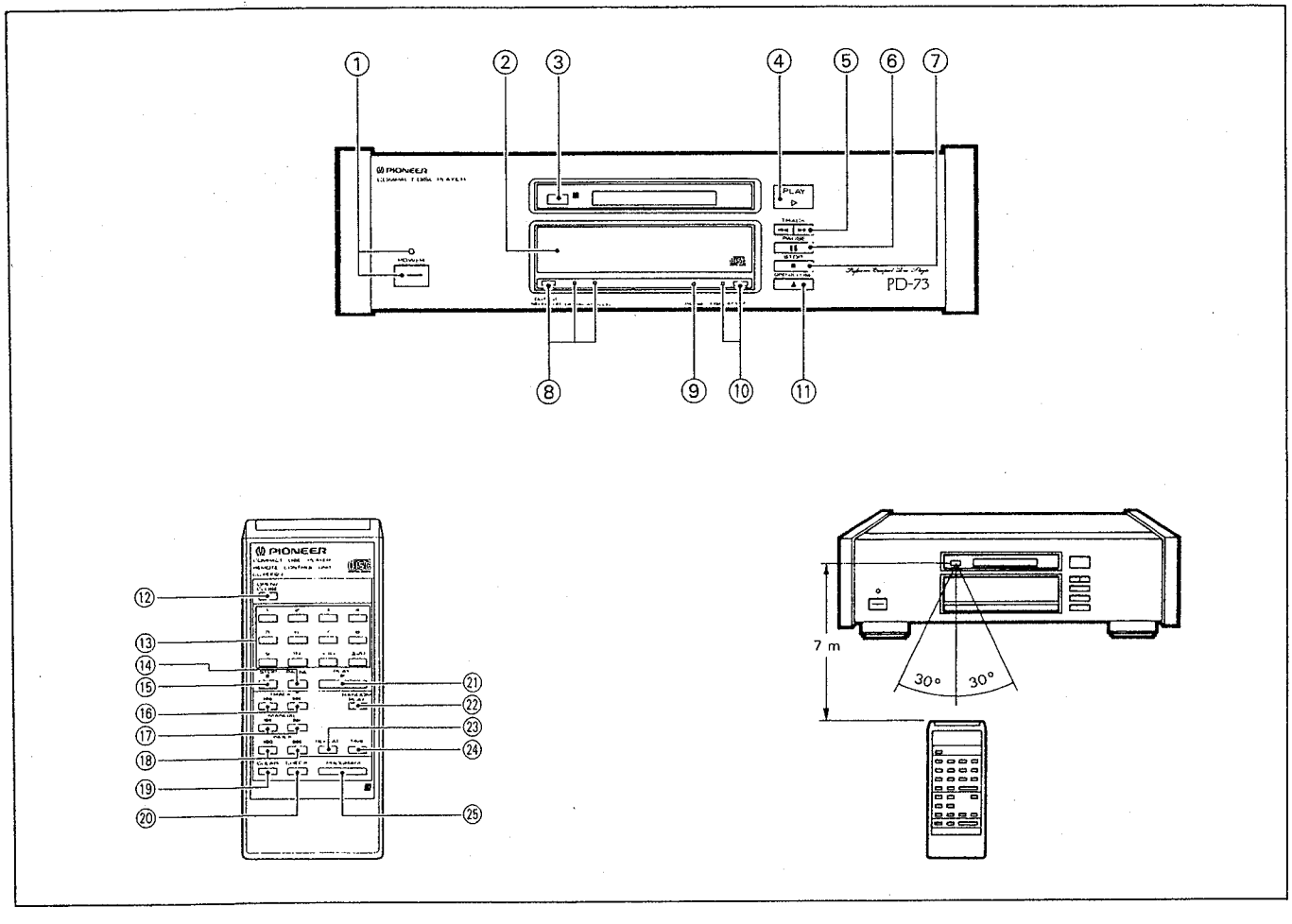


Figura 8

8. PANEL FACILITIES



FRONT PANEL

① **POWER switch/indicator**
Press to turn power ON and OFF.
② **Disc tray**
③ **Remote sensor**
④ **PLAY button/indicator (▷)**
⑤ **TRACK search buttons (|◀◀, ▶▶|)**
⑥ **PAUSE button (▮▮)**
⑦ **STOP button (■)**
⑧ **OUTPUT SELECTOR button/indicators**
⑨ **PAUSE indicator**
⑩ **DISPLAY OFF button/indicator**
⑪ **OPEN/CLOSE button (≜)**

REMOTE CONTROL UNIT

Buttons listed here but not accompanied with explanations have the same functions as the corresponding front-panel buttons.
If use is made of the supplied remote control unit, remote operation is possible.
To use the remote control unit, aim at the remote sensor.
The remote control unit can operate over a range of approximately 23 feet (7 meters), within angles of 30 degrees left and right.

NOTE:
If the remote control sensor window is in a position where it receives strong light such as sunlight or fluorescent light, control may not be possible.

⑫ **OPEN/CLOSE button**
⑬ **Track number buttons (1—10, +10, ≧20)**
⑭ **PAUSE button (▮▮)**
⑮ **STOP button (■)**
⑯ **TRACK search buttons (|◀◀, ▶▶|)**
⑰ **MANUAL search buttons (◀◀, ▶▶)**
⑱ **INDEX search buttons (|◁◁, ▷▷|)**
⑲ **CLEAR button**
⑳ **CHECK button**
㉑ **PLAY button (▶)**
㉒ **RANDOM PLAY button**
㉓ **REPEAT button**
㉔ **TIME button**
㉕ **PROGRAM button**

9. SPECIFICATIONS

1. General

Type ..... Compact disc digital audio system
Usable discs ..... Compact Disc
Power requirements
U.K.and Australian models ..... AC 240V, 50/60Hz
European model ..... AC 220V, 50/60Hz
U.S. and Canadian models ..... AC 120V, 60Hz
Multi-voltage model ..... AC 110/120—127/220/240V (switchable) 50/60Hz
Power consumption 22W
Operating temperature ..... +5°C—+35°C (+41°F—+95°F)
Weight 9.5kg (20lb,15oz)
External dimensions ..... 459(W) × 324(D) × 127(H)mm 18-1/16(W) × 12-3/4(D) × 5(H) in.

2. Audio section

Frequency response ..... 2Hz—20kHz
S/N ..... 113dB or more (EIAJ)
Dynamic range ..... 99dB or more (EIAJ)
Channel separation ..... 110dB or more (EIAJ)
Total harmonic distortion ..... 0.0018% or less (EIAJ)
Output voltage 2.0V
Wow and flutter ..... Limit of measurement (±0.001% W.PEAK) or less (EIAJ)
Number of channels ..... 2 channels (stereo)

3. Output terminal

- Audio line output terminals
- Optical digital output terminal
- Coaxial digital output terminal

4. Functions

- Play
- Pause
- Stop
- Track search
- Manual search
- Index search
- Direct selection
- Single track repeat
- All track repeat
- Programmed repeat
- Random play repeat
- Programmed random play repeat
- Programmed playback (up to 24 steps)
- Pause program
- Program check
- Program correction
- Program clear
- Random play
- Programmed random play
- Time location
- Display off
- Timer start
- Digital/analog output select

5. Accessories

- Remote control unit 1
- Size AAA/R03 dry cell batteries 2
- Output cable 1
- Operating instructions 1

NOTE:
The specifications and design of this product are subject to change without notice, due to improvements.